

Installation and operating instructions

KEMPER KHS Mini System Control

KEMPER KHS Mini System Control MASTER
KHS Mini System Control SLAVE

Figure 686 02 005
Figure 686 02 006

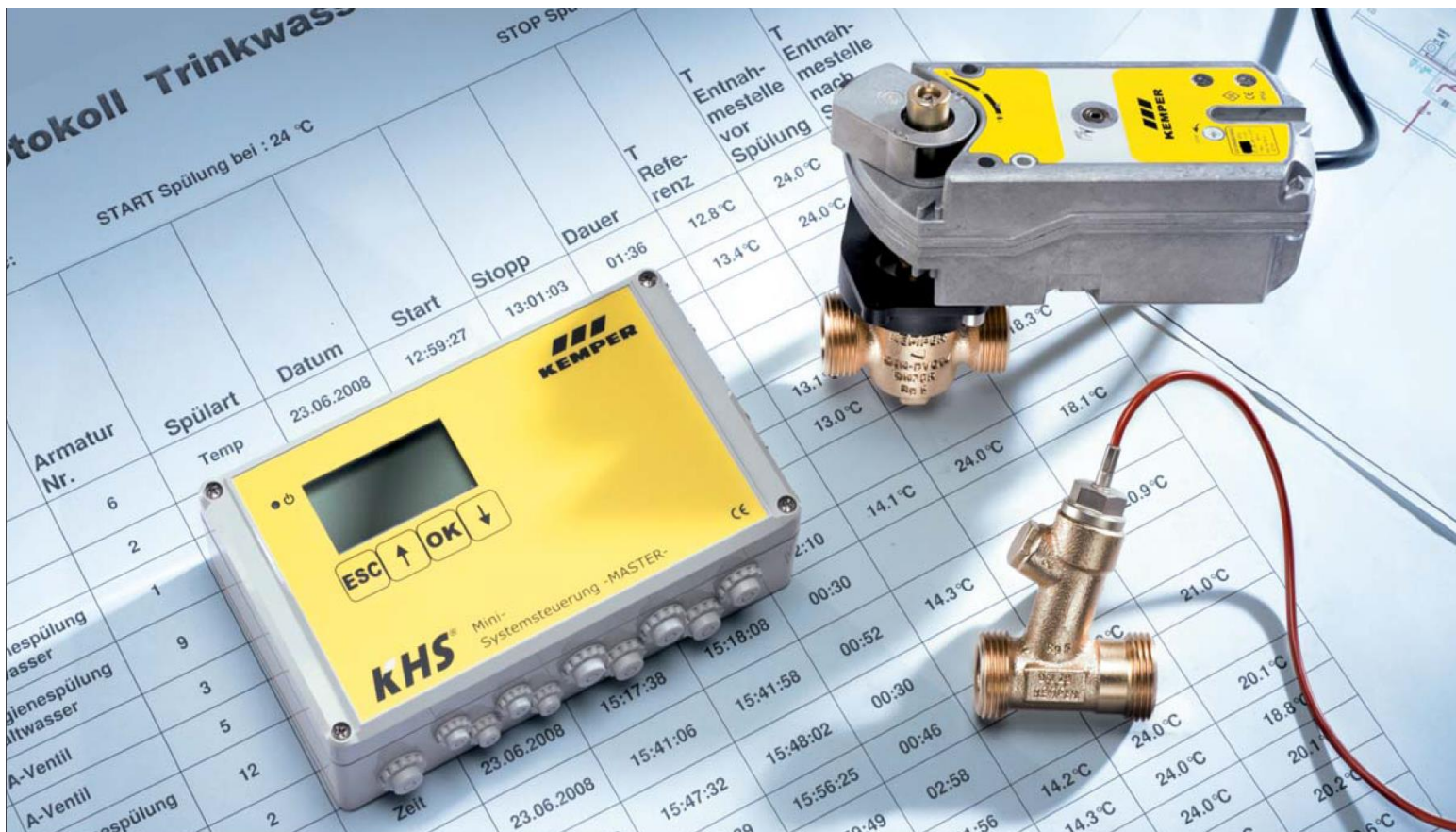


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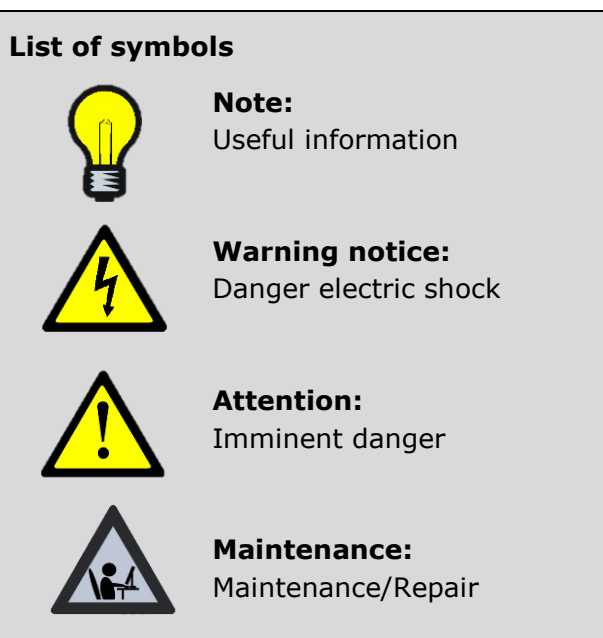
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1. General instructions:

Assemble and commission the KEMPER KTS Mini System Control only after reading these assembly and operating instructions. It informs you in detail about the assembly, commissioning, operating principles and operation of the Kemper KHS Mini System Control. If you cannot find the information and instructions you need in these operating instructions, ask the manufacturer, Gebr. Kemper (please refer to last page for the address). Keep the mounting and operating instructions with the device or file it with the other technical documentation in the system documentation.

Symbols used

The symbols used in the text are explained below.



2. Area of application

The KEMPER KHS Mini System Control can be used for monitoring and water exchange in drinking water systems. The water exchanges can be generated and documented as flushing logs with the -MASTER- control. The dedicated water exchanges prevent stagnation in the drinking water with the aim of maintaining the drinking water hygiene in the drinking water systems. The KHS Mini System Control -MASTER- can be parameterised by a PC-software or by the internal menu.



NOTICE:

If two or more valves are simultaneously opened in a drinking water system, under certain circumstances pressure fluctuations or a large pressure drop can occur in the system. For that reason, make sure beforehand that the required flow pressure is continuously guaranteed at all tapping points. It is recommended to not make simultaneous water exchanges.

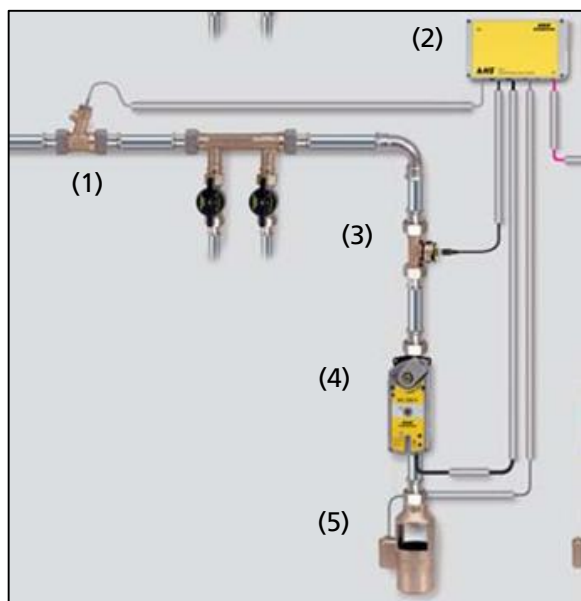
2.1 Operating modes for the water exchange

- Time controlled water exchange
- Temperature controlled water exchange
- Volume controlled water exchange

2.2 KHS MASTER/SLAVE technology

The -MASTER/SLAVE- technology can be used to trigger flushing measures for maintaining the drinking water hygiene for the drinking water system. The corresponding operating modes can be individually configured for each individual water-exchange group. Positioning the individual -MASTER- or -SLAVE- controls directly on the water exchange groups ensures short wiring distances for interconnection.

2.3 Water exchange groups



Shown in Ill. 2.1 as an example is a KHS Mini System Control -SLAVE- (2) in connection with a water exchange group which comprises a KHS Isolating valve (4), Temperature sensor (1), Volume flow sensor (3) and a KHS Drain (5). The components of the water exchange group are only listed as examples here. The operating mode depends on the components. In the example illustrated, the -SLAVE-(2) controls the specified water exchange groups. It is connected with the -MASTER- through a CAN bus cable.



Note:

Maintenance cut-offs are recommended in front of the Volume flow sensor (3).

Ill. 2.1 Illustration of a water exchange group

3. Safety

The descriptions and instructions in these operating instructions concern the KHS Mini System Control -MASTER- and KHS Mini System Control -SLAVE-.



Warning notice:

During assembly and maintenance, make sure that the control is not switched on.

Only skilled professional personnel are permitted to operate electrical systems (as per DIN EN 50110-1). Danger of fatal electric shock.

3.1 Safety Instructions

Before commissioning, make sure the connections have been made properly and professionally and that the system is properly protected. Comply with the pertinent regulations (EN, VDE, etc.) and the regulations of the local energy utility.

3.2 Hazards if the safety instructions are not complied with

Non-compliance with the safety instructions can result in both hazards to people and hazards to the environment and the system. Non-compliance with the safety instructions leads to the loss of rights to any compensation claims. In some cases, non-compliance can, for example, result in the following hazards:

- Failure of important functions in the device
- Hazards to people through electrical and mechanical effects

3.3 Unauthorized alteration and spare part fabrication

Alterations and modifications to the device are only permissible after agreement with the manufacturer. Original spare parts and manufacturer authorised accessories serve the purpose of safety. The use of any other parts may annul the liability for any resultant consequences.



Attention:

Use only original/approved spare parts ⇒ otherwise no warranty claims will be recognized.

3.4 Unauthorised modes of operation

The reliability of the supplied unit is only ensured when used as intended. Never exceed the limits stated in this documentation under any circumstances.



Note:

If the operating instructions are not followed, the manufacturer of this controller does not assume any responsibility. These operating instructions contain basic instructions that must be complied with during set-up, commissioning and maintenance. Therefore, the plumber/mechanic and the responsible specialists/operators must read these operating instructions before assembly and commissioning. Comply not only with the general safety instructions listed in this main point; also follow the specific safety instructions listed under the other main points.

4. Technical Data

Technical Data
↻ Power supply 230 V AC 50/60Hz
↻ Display Graphic display with background lighting
↻ Operation with 4 buttons: Up Down Enter Esc
↻ Relay flush valve switching capacity 230 V, 2 A
↻ Floating alarm relay, max. 230 V, 2 A
↻ 16 memory locations for the operating modes: <ul style="list-style-type: none"> • Time controlled water exchange • Temperature controlled water exchange • Volume controlled water exchange • Routine-time, routine-duration and routine-volume
↻ For connecting: <ul style="list-style-type: none"> • 1 ea. KHS Isolating valve-plus <i>or</i> KHS Isolating valve • 1 ea. KHS Temperature sensor Pt 1000 • 1 ea. KHS Control Plus volume flow measurement valve • 1 ea. KHS overflow monitor
↻ Acoustic alarm signal in case of faults (disengageable)
↻ Alarm acknowledgement on -MASTER-
↻ System is expandable: 1 -MASTER- with max. 62 - SLAVEs- via CAN bus
↻ Bus system connection per direction: CAN installation cable, max. 1000m total length, overall 2000m possible
↻ Serial interface for the PC-link by the customer for configuration and for reading out the flush log
↻ Can save 50,000 journal entries
↻ External switch Switchover: <ul style="list-style-type: none"> • Program 1 (e.g. school-holidays program) • Program 2 (e.g. school program) • Maintenance mode (system is blocked)
↻ Menu driven operation in German, English or Dutch
↻ Internal consumption 10 VA
↻ Manual operation of the valves on device
↻ Ambient temperature range from 0 °C to 50 °C
↻ Protection class IP 54
↻ Surface mounted housing for wall installation
↻ USB interface for updating the firmware, reading out the journal and data logging and for downloading and uploading the configuration file
↻ Network link through network cable (accessory)

5. CAN bus system overview

The basic version of the -MASTER- control system includes as the smallest solution a flushing valve for water exchanging measures. This -MASTER- System Control is required for triggering the flushing valve and for signal evaluation.

Up to a maximum of 31 -SLAVE- controls per CAN-BUS connection of the -MASTER- can be controlled per CAN bus connection. Furthermore, the -MASTER- System Control, using two integrated CAN bus connections, can trigger up to 62 -SLAVE- controls and one directly-connected KHS water exchange group.

- ▶ That means up to 63 KHS water exchange groups can be connected and operated. The accumulated total length of one CAN bus connection can amount to a maximum of 1000 m (total length is thus 2000m).

5.1 Layout variants



Note:

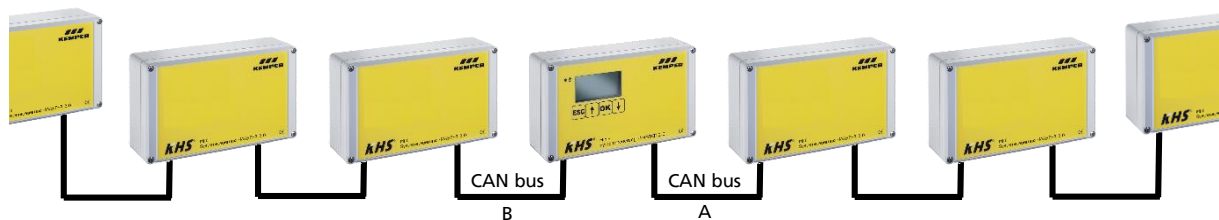
The controllers must be connected in series, as can be seen in Example 1. During this, the -MASTER- System Control can be connected within the series (Variant 2) or as a final subscriber (Variant 1). Branches or start connections, as can be seen in Example 2, are not possible. Furthermore, shorter cable distances are recommended.

Example 1: Layout variant, KHS-Mini System Control -MASTER-

Variant 1

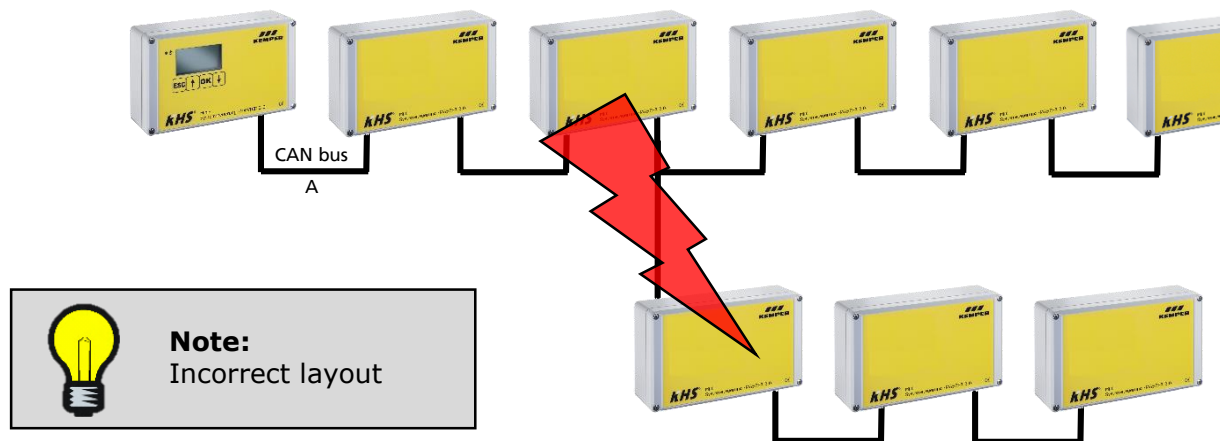


Variant 2



III. 5.1 Illustration of a layout variant, KHS Mini System Control -MASTER- system control

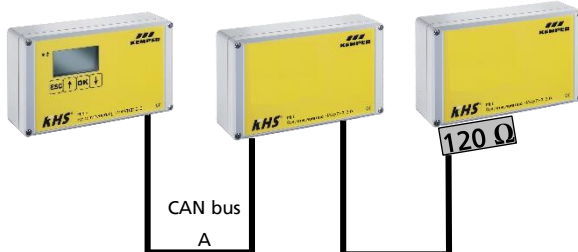
Example 2: Incorrect layout



III. 5.2 View of an impermissible layout variant, KHS Mini System Control -Master-

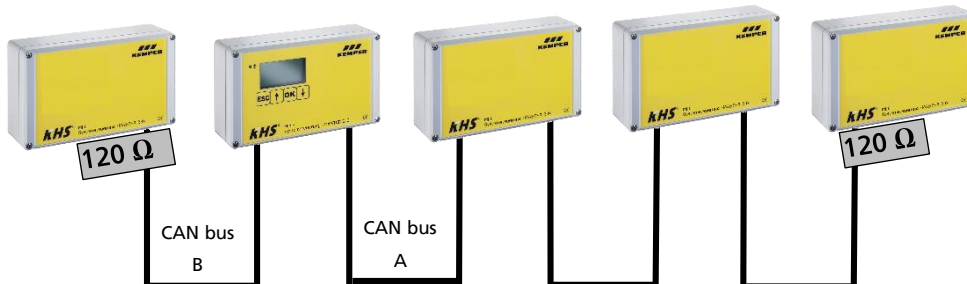
5.2 Terminal resistance

Variant 1



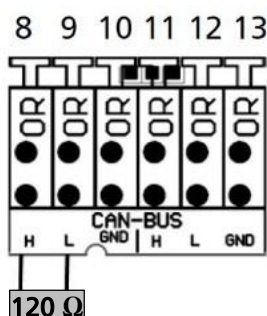
Note:
The 120 Ω terminal resistance must be installed only in the last control component (-SLAVE-) of a CAN bus cable line. The -MASTER- control does not require a terminal resistance.

Variant 2



III. 5.3 Illustration of a CAN bus line with terminal resistor

5.3 Connection of terminal resistor



Attention:
All KHS Mini controls -SLAVE- are supplied with a 120 Ω terminal resistor. For non-terminal -SLAVE-controls, the resistor must be removed!

III. 5.4 Illustration of the terminal resistor

6. Assembly


Warning notice:

Allow only certified electricians to assemble and install electrical equipment. Danger of fatal electric shock.

Very strong magnetic fields can impair the functioning. Interferences can be prevented by following the installation rules below:

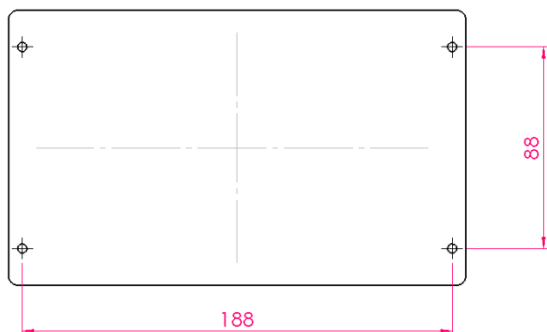
- Do not mount the controller and the sensors near inductive loads (motors, transformers, contactors, etc.).
- Feed through a separate mains voltage circuit (if necessary, with an a.c. mains filter).
- Inductive loads must be equipped with safeguards to reduce overvoltages (varistors, RC-filter).


Attention:

When using the controller together with other devices in one system, check to see if that causes interference signals to be emitted.

6.1. Wall mounting

The KHS Mini System Control is intended for wall installation. The housing has 4 each \varnothing 4mm mounting holes in a clearance of $w = 188\text{mm}$ and $h = 88\text{mm}$. Additional dimensions are listed in Chapter 10. To mount, open the cover and screw the device tightly to the wall. After mounting the housing, make the required electrical connections.



III. 6.1 Illustration of the mounting holes for wall installation

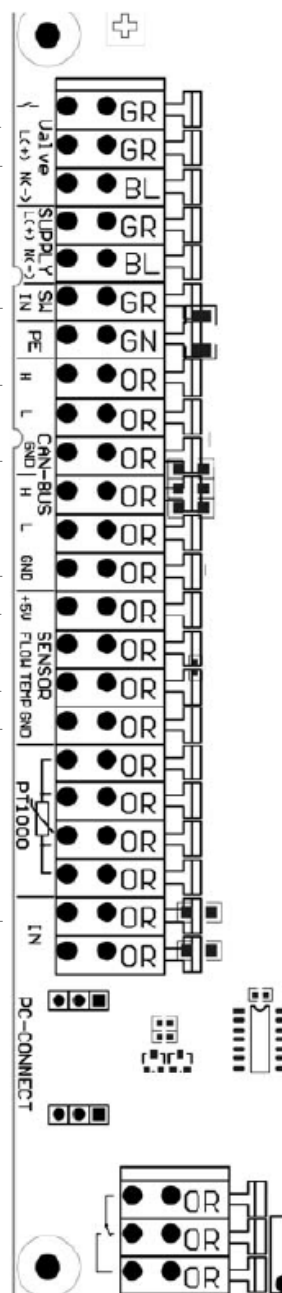
6.2 Electrical installation KHS Mini System Control

The following chapter explains the electrical installation. The electrical connections are made through screwless-type terminals.

6.2.1 Terminal description -MASTER- and -SLAVE-

Illustration: Control board with terminals

1. Flushing valve switching output 230 _____
2. Flushing valve voltage output 230 V (only on 68604) _____
3. Flushing valve N _____
4. Power supply - LI 230V _____
5. Power supply – N _____
6. External input 230 V (Function only with -MASTER-) _____
7. Grounded conductor PE _____
8. CAN-Bus HIGH 1 _____
9. CAN-Bus LOW 1 _____
10. CAN-Bus GND 1 _____
11. CAN-Bus HIGH 2 _____
12. CAN-Bus LOW 2 _____
13. CAN-Bus GND 2 _____
14. Flow measurement valve - Voltage output 5V _____
15. Flow measurement valve - Flow input _____
16. Flow measurement valve - no function _____
17. Flow measurement valve GND _____
18. Pt 1000 Input 1 _____
19. Pt 1000 Input 2 _____
20. Pt 1000 Input 3 _____
21. Pt 1000 Input 4 _____
22. Drain floating switch (strands interchangeable) _____
23. Drain floating switch (strands interchangeable)
[Terminals 22 and 23 can also be used to connect
the water sensor]
- PC-interface _____
(only for -MASTER-:
jack plug, no clamp)
24. Alarm relay voltage input external _____
25. External monitor voltage error _____
26. External monitor voltage operation _____



III. 6.2 Cut-out view of the -MASTER- and -SLAVE- controller board with terminals

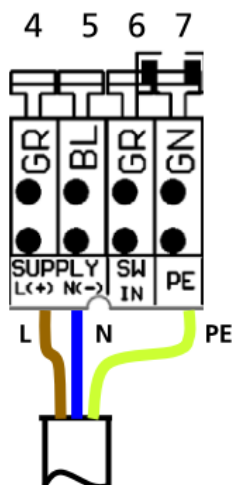
6.2.2 Detailed illustration of the terminals for cable entry



Note:

The following illustrations apply to the KHS Mini System Control -MASTER- and the KHS Mini System Control -SLAVE-. Please note the preceding warning notices.

6.2.2.1 Power supply connection



Power supply: 230 V +/- 15% AC 50/60Hz

Connection: Terminals, L, N, PE

Line fuse max. 16A

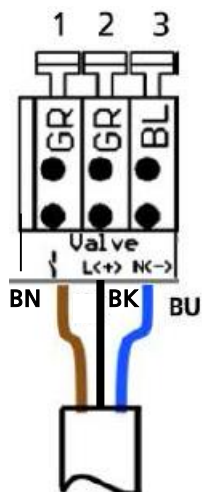
BN = brown = L

BU = blue = N

GR = green = PE

Ill. 6.3: Schematic representation of the power supply connection

6.2.2.2 Connection of KHS Isolating valve with servo-drive (Figure 686 04 / 696 04)



BN = brown = 1

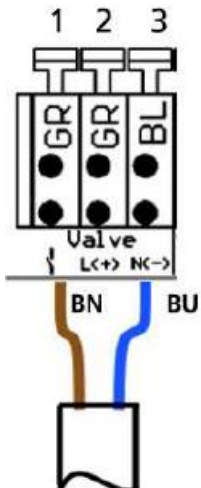
BK = black = 2

BU = blue = 3



Ill. 6.4: Schematic representation of the connection of the KHS Isolating valve

6.2.2.3 Connection of KHS Isolating valve with spring reset servo-drive (Figure 686 05 / 686 15 / 696 05)

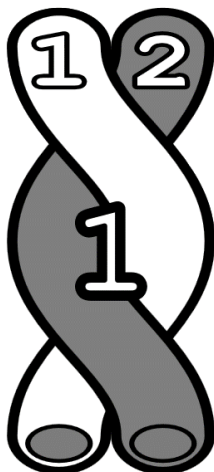


BN = brown = 1
BU = blue = 3



Ill. 6.5: Schematic representation of the connection of the KHS Isolating valve with spring reset servo-drive

6.2.2.4 CAN bus connection

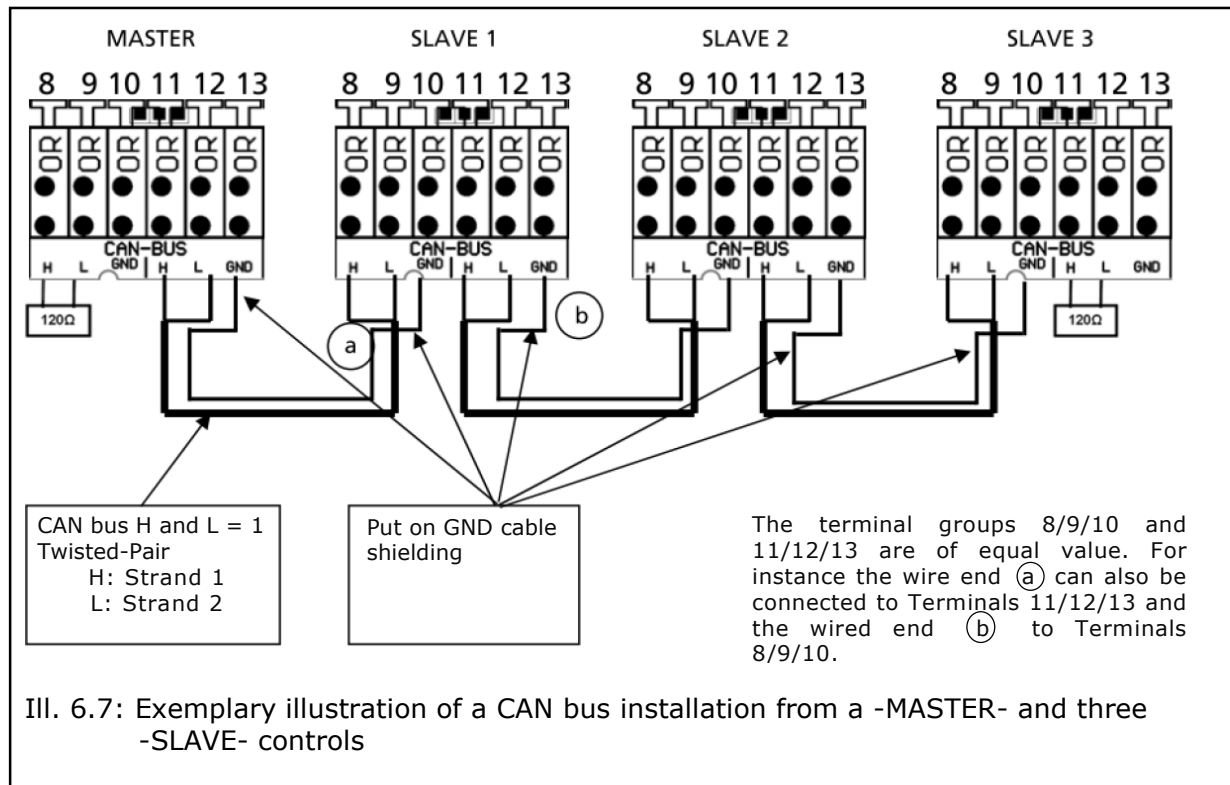


Attention:

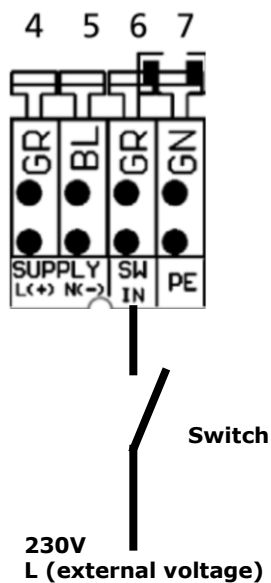
Follow the notices and instructions in Chapter 5. The twisted pair of the CAN bus cable should be separated and the shielding removed only as far as necessary to assign the maximum terminals (recommendation: max. 4cm).

The shielding must be properly bundled with a heat shrink tube or insulating tape to prevent contact of the individual wires of the shielding to the other potentials.

Ill. 6.6: Schematic diagram of the twisted pair



6.2.2.5 Connection of external switch



Attention:

The external connection can only be used with the KHS Mini System Control -MASTER-.

Power supply: 230V +/- 15% AC 50/60Hz
Line fuse max. 16A

BK = black = L

III. 6.8: Schematic diagram of connection of external switch

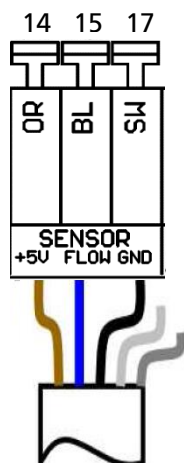


Note:

Through the trigger on Terminal 6 you have a facility to switch the KHS Mini System Control program with external switching processes through a 230V input. The program switching of the external connection is discussed in Chapter 8.

6.2.2.6 Connection of KHS-CONTROL-PLUS flow measurement valve (Figure 638 4G / 138 4G)

Connection of KHS-CONTROL-PLUS volume flow measurement valve

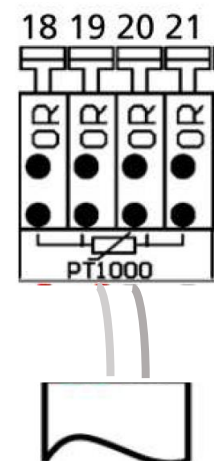


BR = +5V DC = 14
BU = Flow = 15
BK = GND = 17



III. 6.9: Schematic diagram of connection of KHS-CONTROL-PLUS flow measurement valve

Connection of KHS-CONTROL-PLUS temperature sensor



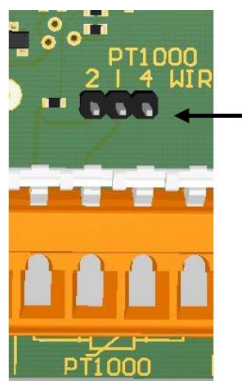
Attention:

The KHS-CONTROL-PLUS has an internal Pt 1000, enabling an additional temperature measurement. If no temperature measurement is needed or a Pt 1000 connected, insulate and protect the strands from contact with the board.

GY = grey (green/yellow) = 19
W = white = 20

III. 6.10: Schematic diagram of connection of KHS-CONTROL-PLUS volume flow sensor

Note



Attention:

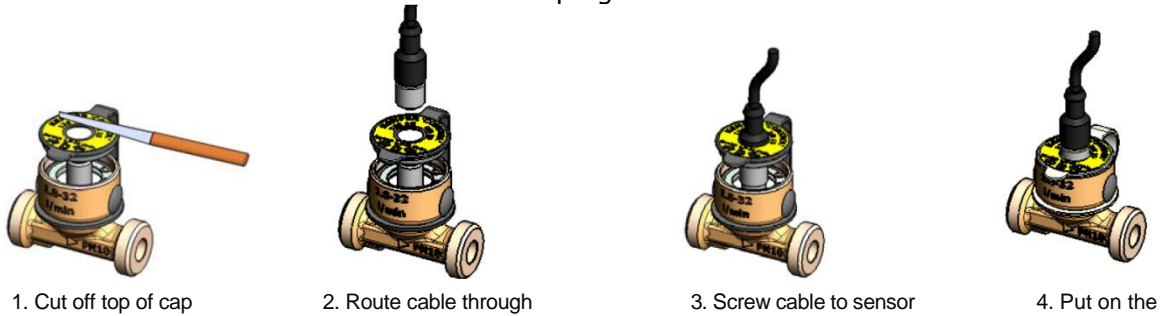
To perform the temperature measurement through the KHS-CONTROL-PLUS, the jumper on the board must be changed from 4-wire to 2-wire, see Photo 6.11.

Important comment:

During this measurement, the temperature measurement is falsified through the line resistance. For 10m line-length with 0.34mm² cross-section, the measurement falsification can amount to approx. + 0.5°C.

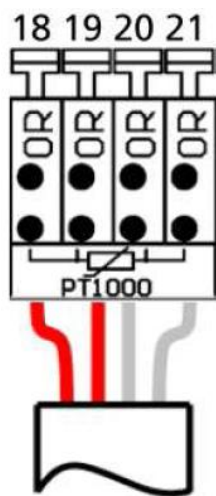
III. 6.11: Schematic diagram of connection of KHS-CONTROL-PLUS temperature sensor

Connection of KHS-CONTROL-PLUS cable-plug connector



III. 6.12: Schematic diagram of the preparation of the sensor top to make cable-plug connection of the KHS-CONTROL-PLUS

6.2.2.7 Connection of KHS Temperature sensor Pt 1000 (Figure 628 0G)



RD = red = 18
RD = red = 19
W = white = 20
W = white = 21



III. 6.13: Schematic diagram of connection of KHS Temperature Measurement Valve Pt 1000

6.2.2.8 Connection of KHS drain with overflow monitor (Figure 688 00)



Note:

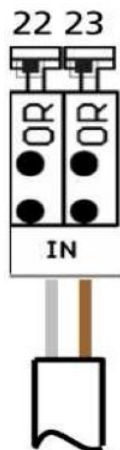
In the as delivered state, a bridge strand is plugged between Terminals 22 and 23. It must be removed before connecting the KHS drain.

W = white = 22
BN = brown = 23



III. 6.14: Schematic diagram of connection of the KHS drain with overflow monitor

6.2.2.9 Connection of water sensor (Figure 620 00)



Note:

It is possible to link up to 25 water sensors in parallel in the detection circuit.

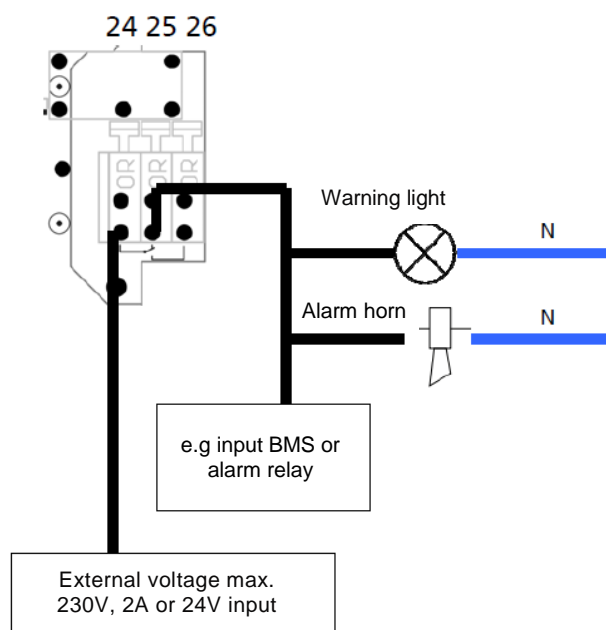
- Max. cable length water sensor: **< 50m** with standard cable
- Max. cable length water sensor: **> 50m to 500m** as shielded cable, 2x 0.75 mm², (e.g. UL-LYCY)

W = white = 22
BN = brown = 23



Ill. 6.15: Exemplary diagram of the water sensor connection

6.2.2.10 Connection of floating alarm relay



Monitoring example: Errors and mains voltage failures are reported with external voltage to the warning lamp, the warning horn or to the BMS.

Ill. 6.16: Exemplary diagram of the alarm relay

7. Commissioning

After finishing the wall installation and the electrical installation in accordance with Chapter 5, apply the mains voltage of 230V.

**Warning notice:**

Allow only certified electricians to assemble and install electrical equipment. Danger of fatal electric shock.

ATTENTION!

**Note:**

To simplify the control system and to guarantee flawless installation, fill in the overview of the system commissioning of the KHS Mini System Control (see supply pressure, Chapter 13.2) before making the settings. It is mandatory to fill in the supply pressure to be able to take advantage of the optional factory support.

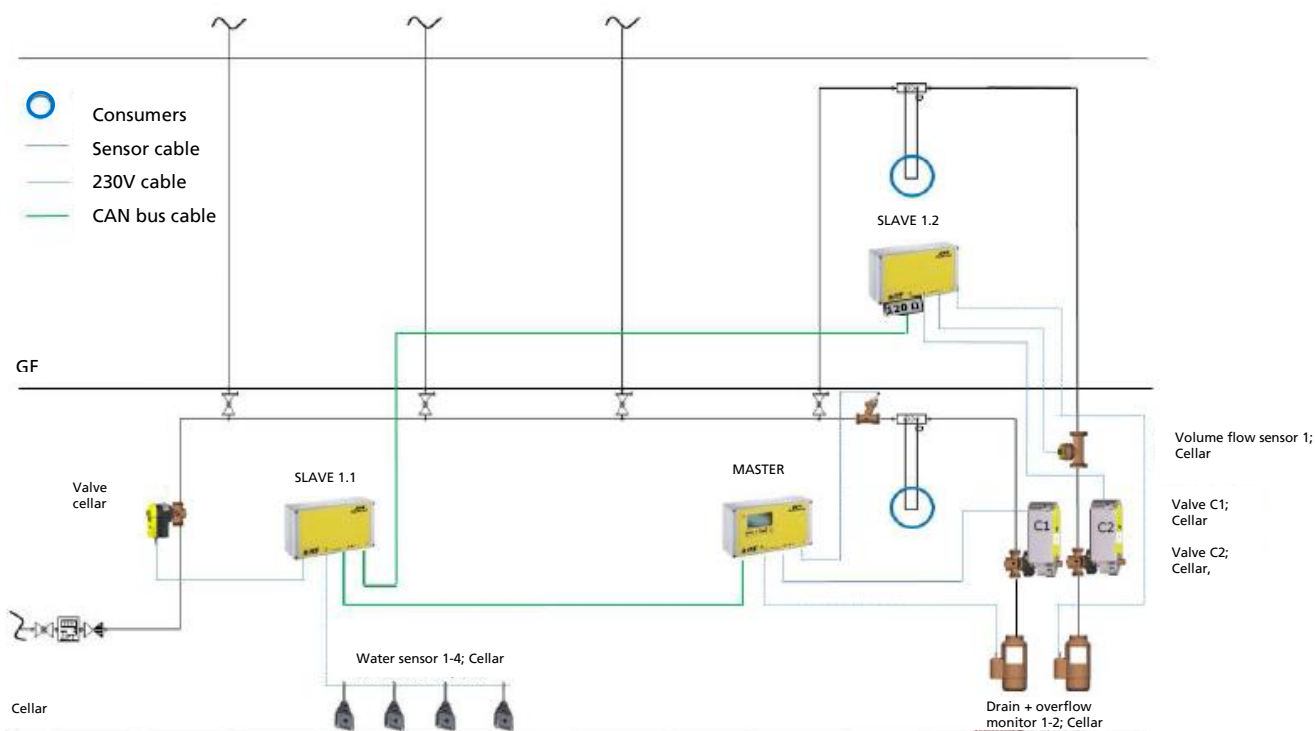
8. Configuration

The KHS Mini System Control -MASTER- can be configured through the internal menu driven operation or through a web server. Furthermore, the saved configurations can be uploaded through a USB interface to the KHS Mini System Control -MASTER-.

The sample project shown below shows the basic controller types of the KHS Mini System Control -MASTER-. The individual configuration facilities of the KHS Mini System Control -MASTER- is elucidated using exemplary configurations of the sample project in the following chapters (Ill 8.1 and 8.2).

After all units, as described in Chapter 6, have been mounted and electrically connected, the actual configuration of the individual KHS Mini System Controls starts.

The sample project has one KHS Mini System Control -MASTER- and two KHS Mini System Controls -SLAVE-. The system controls shown in Illustration 8.1 are intended to secure the cold-water line against stagnation and leaks in a fictitious building.



III. 8.1 Sample project

8.1 Manual configuration

Basic settings, configurations and changes can be made onsite by using the integrated menus. In the following chapter, the menu interfaces and their functions are clarified. To explain the settings and functions, the sample project is configured as a reference building.

8.1.1 Basic menu operation and functions

The KHS Mini System Control is set and operated through various menus, which appear in the -MASTER- display. Access to the menus is enabled through the control panel on the -MASTER- with the four control buttons.



"ESC" button: Exit the menu / switch between overview and main menu

"↑" button: Scroll back

"OK" button: Confirm button

"↓" button: Scroll forward

III. 8.2 -MASTER- buttons

The menus are structured "scrolling", i.e., pushing the "↓-button" on the last menu item jumps back to the first menu item. Likewise, pressing the "↑-button" changes from the first to the last menu item.



Note:

If no entry is made for three minutes, the control reverts from the setting mode to the general plan.

Window types

Menu operation is divided into two sections. The following windows are available:

- "General plan"
- "Main menu".

The functions of the windows are listed in Table 8.1.

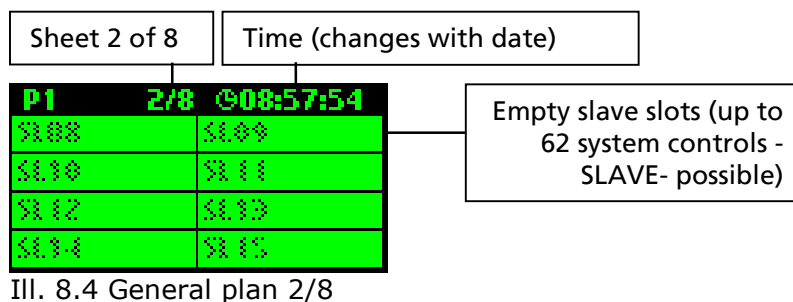
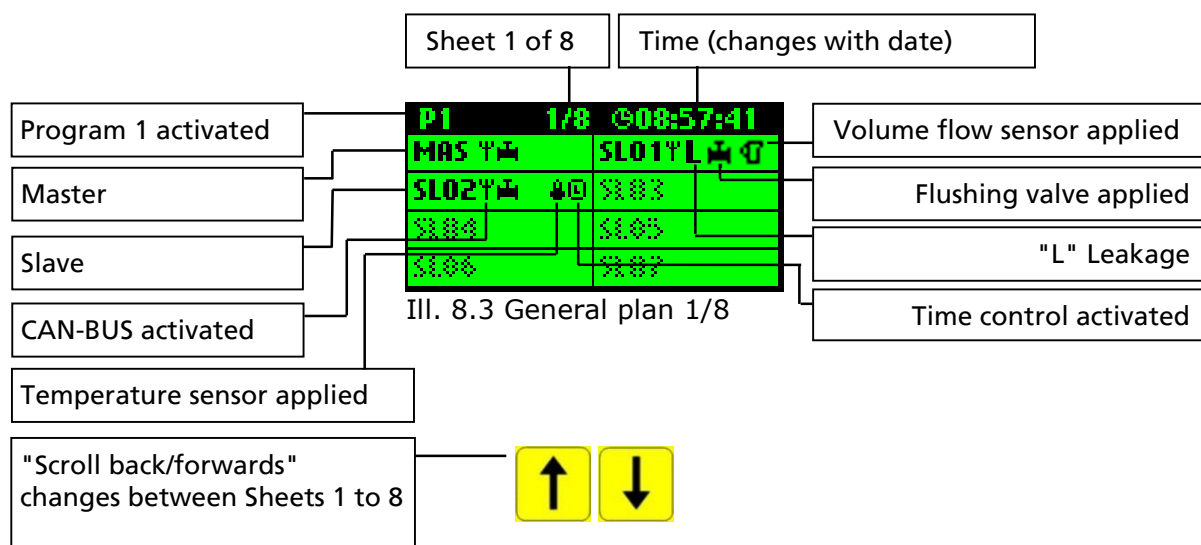
- The "General plan" window is used only for visualising the current states.
- In the "Main menu" window, preset parameters can be viewed, changed and saved. The "Main menu" window can be protected against changes caused by interference through password protection.

Tab. 8.1 Chart of window types

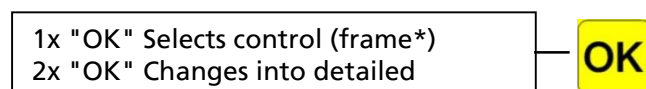
Window types	
General plan	Main menu
Viewing possible without password	Viewing impossible without password
Functions: <ul style="list-style-type: none"> • Detailed overview • Control state display • View network • Device settings • Flushing processes • Error statuses 	Function: <ul style="list-style-type: none"> • Setting the control parameters • CAN BUS setup • Select the operating modes • Journal • Program selection

8.1.2 General plan

The following illustrations explain the "General plan" menu interface of the KHS Mini System Control -MASTER-. The illustrations show the "General plan" based on an exemplary configuration of a system with one KHS Mini System Control -MASTER- and two KHS Mini System Controls -SLAVE-.



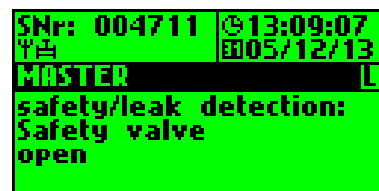
Changes from "General plan" into "Detailed overview"



*: A frame appears around the entry of the first controller (see Ill 8.5 upper left) on the selected sheet (1 to 8). Pressing the OK button again opens the "Detailed overview" (see Ill. 8.6) of the selected control. Optionally, press the ↑ or ↓ button to select another active controller. It is indicated again through a flashing frame. If you now press the OK button, the detailed overview of another controller appears.



III. 8.5 Controller selection



III. 8.6 Detailed overview



Legend symbols

Water exchange activated: Valve symbol is framed

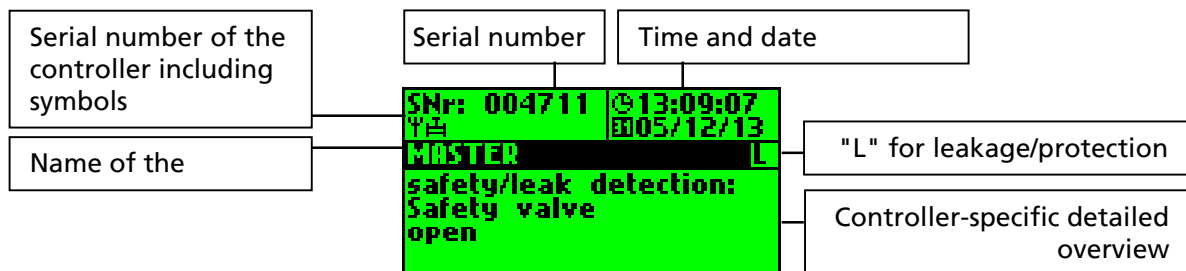
Time control -> Time symbol flashes

Volume control -> Volume symbol flashes

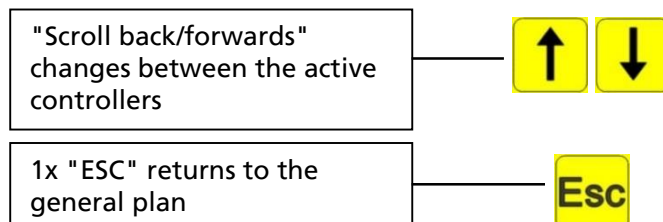
Temperature control -> Temperature symbol flashes

8.1.3 Detailed overview

The following illustrations clarify the "Detailed overview" menu interface of the KHS Mini System Control -MASTER-. The illustrations show the "Detailed overview" based on an exemplary configuration of a system with one KHS Mini System Control -MASTER- and two KHS Mini System Controls -SLAVE-.



III. 8.7 Detailed overview



Legend symbols

Water exchange activated: Valve symbol is framed

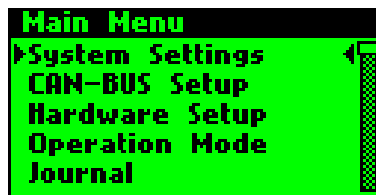
Time control -> Time symbol flashes

Volume control -> Volume symbol flashes

Temperature control -> Temperature symbol flashes

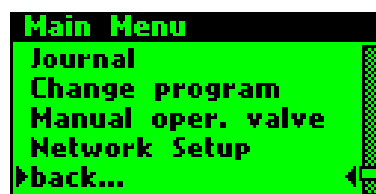
8.1.4 Main menu

The following chapters explain the functions of the "Main menu" interface of the KHS Mini System Control -MASTER-. In the main menu there are the sub-menus: System settings, Can-bus setup, Device settings, Operating modes, Journal, Switch program, Valve manual mode, Network setup (see Ill. 8.8 and Ill. 8.9).



Ill. 8.8 Main menu "top"

"Scroll back/forwards"
Selection of the submenu



Ill. 8.9 Main menu "bottom"

Scrollbar indicates the
position in the menu

1x "OK" Changes into the selected
submenu



1x "ESC" returns to the main
menu

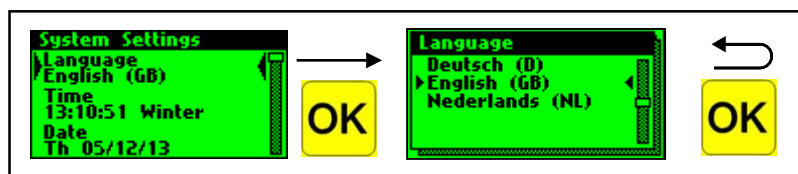


8.1.4.1 System settings

In the "System settings" menu interface, settings for the date / time, language daylight savings/standard time, alarm buzzer, button acknowledgement, display lighting, display contrast, password, factory settings and system reboot can be made.

Language

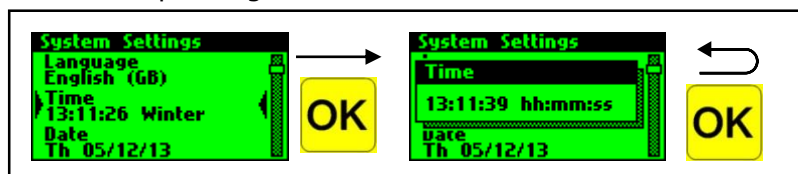
In the system control submenu select the menu item "Language" with "OK"; press "OK" again to store the selected language and to open the system control submenu again.



III. 8.10 Setting the language

Time

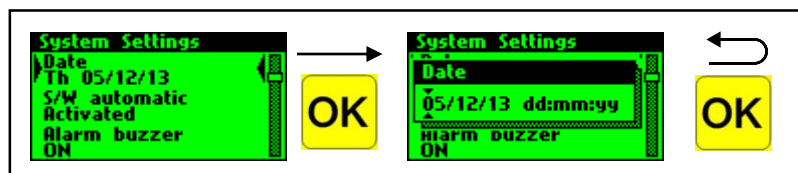
In the system control submenu, select the "Time" menu item with "OK"; press the "↑" and "↓" button to change the selected digit. Press the "OK" button to confirm and to select the next digit. Pressing "OK" again stores the set time and the system control submenu opens again.



III. 8.11 Setting the time

Date

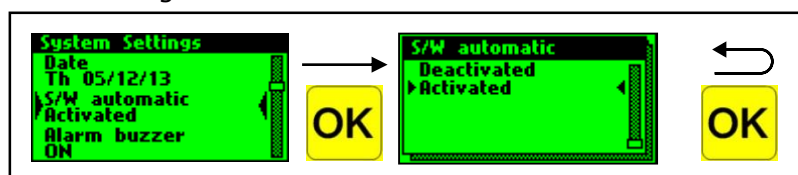
In the system control submenu, select the "Date" menu item with "OK"; press the "↑" and "↓" button to change the selected digit. Press the "OK" button to confirm and to select the next digit. Pressing "OK" again stores the set date and the system control submenu opens again.



III. 8.12 Setting the date

S/W automatic

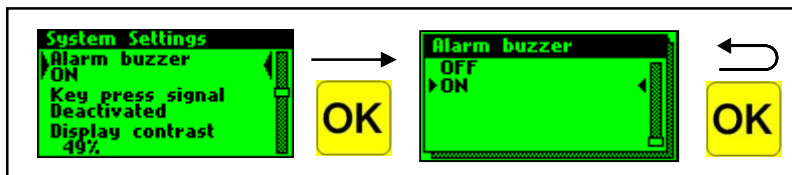
In the system control submenu select the menu item "Daylight savings/Standard time" with "OK"; press "OK" again to save the selected setting and to open the system control submenu again.



III. 8.13 Daylight savings/Standard time automatic

Alarm buzzer

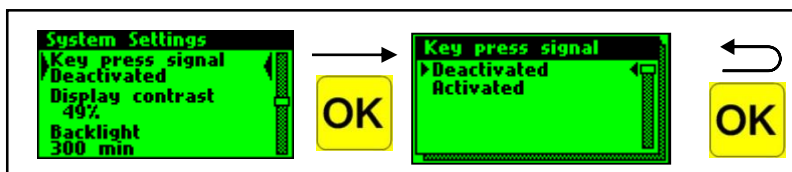
If an error occurs in the system controllers, it can be acoustically reported. To activate this function, select the menu item "Alarm buzzer" in the system control submenu with "OK". Pressing "OK" again saves the selected setting; the system control submenu opens again.



III. 8.14 Activating the alarm buzzer

Key press signal

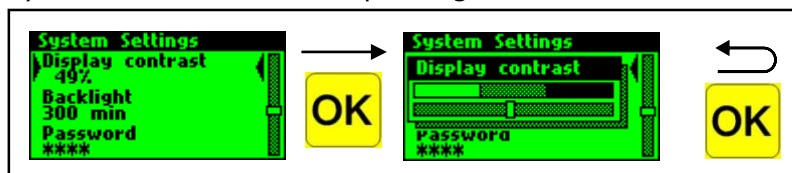
The key press signal can be activated or deactivated through the "Key press signal acknowledgement" menu item. To do that, select the "Key press signal acknowledgement" menu item in the system control submenu with "OK". Pressing "OK" again saves the selected setting; the system control submenu opens again.



III. 8.15 Activating the button

Display contrast

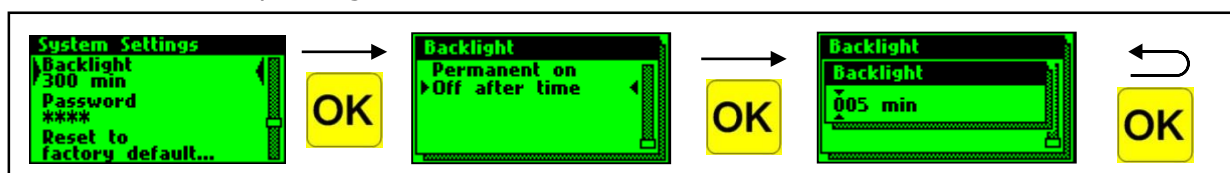
Use the "Display contrast" menu item to set the display contrast. To do that, select the "Display contrast" menu item in the system control submenu with "OK". Press the "↑" and "↓" buttons to change the contrast. Pressing "OK" again saves the selected setting; the system control submenu opens again.



III. 8.16 Display contrast

Display illumination

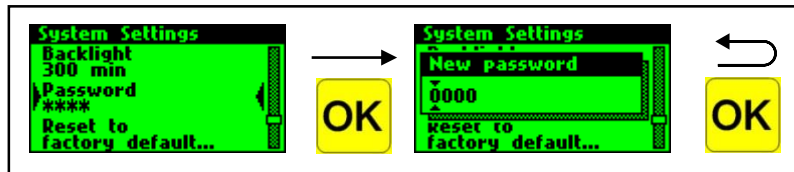
Use the "Backlight" menu item to set the operating time of the display illumination after the last press of a button. To do that, select the "Backlight" menu item in the system control submenu with "OK". Press the "↑" and "↓" buttons to change the time the display continues to illuminate. Save the selected settings by pressing "OK" again. The system control submenu opens again.



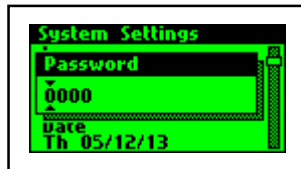
III. 8.17 Display illumination

■ Password

To protect the controller from interference, a password can be configured. If a password has been stored, the password will be queried before every setting (see Ill. 8.19). To do that, select the "Password" menu item in the system control submenu with "OK". Use the "↑" and "↓" buttons to select the digit. Press the "OK" button to confirm and to select the next digit. Pressing "OK" again stores the set password and the system control submenu opens again.



Ill. 8.18 Setting the password



Ill. 8.19 Password query

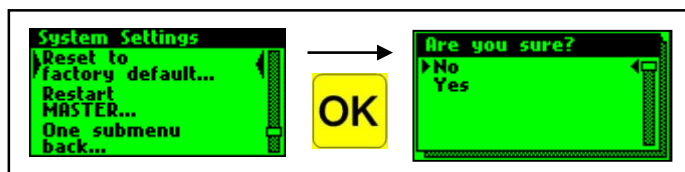


Note:

The password "0000" is the factory default setting.

■ Default settings

To reset the control to the default settings, select the menu item "Default setting" in the system control submenu with "OK". A query then opens. If it is acknowledged with "OK", the system is reinstalled.



Ill. 8.20 Restore the default settings

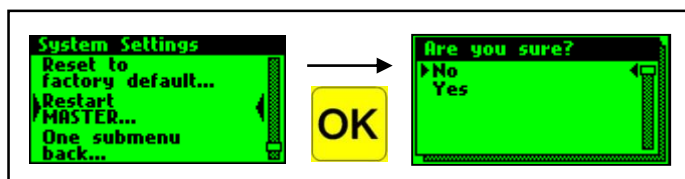


Note:

All previous configurations will be lost!

■ Restart the MASTER

To restart the controller, select the menu item "Restart MASTER" in the system control submenu with "OK". A query then opens. If it is acknowledged with "OK", the system is restarted.











Ill. 8.21 Restart -MASTER-

8.1.4.2 CAN BUS setup

Use the "CAN BUS setup" to add "SLAVE System Controls" that are connected to the - MASTER 2.0- through the CAN bus system to the CAN BUS network.

The following configuration steps are discussed based on the sample project from Illustration 8.1 (Page 16). For an overview of the system commissioning, Illustration 8.22 is presented.

Overview for the system commissioning on the KHS Mini System Control -MASTER - Figure 686 02
(make a hand-written entry based on the example during the installation)

Building name:				 Figure 686 05 Figure 696 05	 Figure 686 04 Figure 696 04	KHS-CONTROL-PLUS flow measurement valve Figure 138 4G and Figure 638 4G									 KHS PT1000	 KHS drain with over-flow	 Water sensor	
Date:						Measurement range max=	Measurement range min=	Measurement range max=	Measurement range min=	Measurement range max=	Measurement range min=	Measurement range max=						
Person commissioning:						0.9 – 15 l/min.	1.8 – 32 l/min.	3.5 – 50 l/min.	5.0 – 85 l/min.	9.0 – 150 l/min.	11 – 188 l/min.	18 – 316 l/min.	Figure 628 0G 629 0G	Figure 688 00				Figure 620 00
Control	No.	Serial no. (Rating plate on the control)	Location/room		or													
Master		4711	Cellar	x										x	x			
Slave	1.1	2675	Cellar													x		
Slave	1.2	1187	GF	x			x								x			
Slave																		

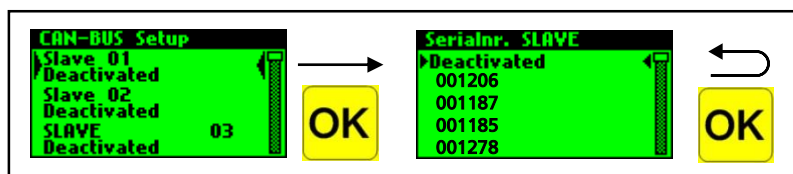
III. 8.22 Overview for the system commissioning of the sample project

Adding devices

Before you can configure the KHS Mini System Controls, you have to add them to the system.

- ▶ To add a KHS Mini System control, the desired position has to be specified in the "CAN-BUS Setup" submenu with "OK".
- ▶ Subsequently, the serial numbers of all connected KHS Mini System Controls -SLAVES- are shown.
- ▶ Press the "↑" and "↓" buttons and confirm with "OK" to add the desired control.
- ▶ The "CAN-BUS Setup" submenu then reopens.

Based on this scheme, all connected KHS Mini System Control -SLAVE- are added to the -MASTER-.



III. 8.23 Adding devices

When all the devices have been added, they are displayed in the main view as shown in Illustration 8.23.

P1	1/8	11:40:32
MAS Y	SL01 Y	
SL02 Y	SL03 Y	
SL04 Y	SL05 Y	
SL06 Y	SL07 Y	

III. 8.24 General plan

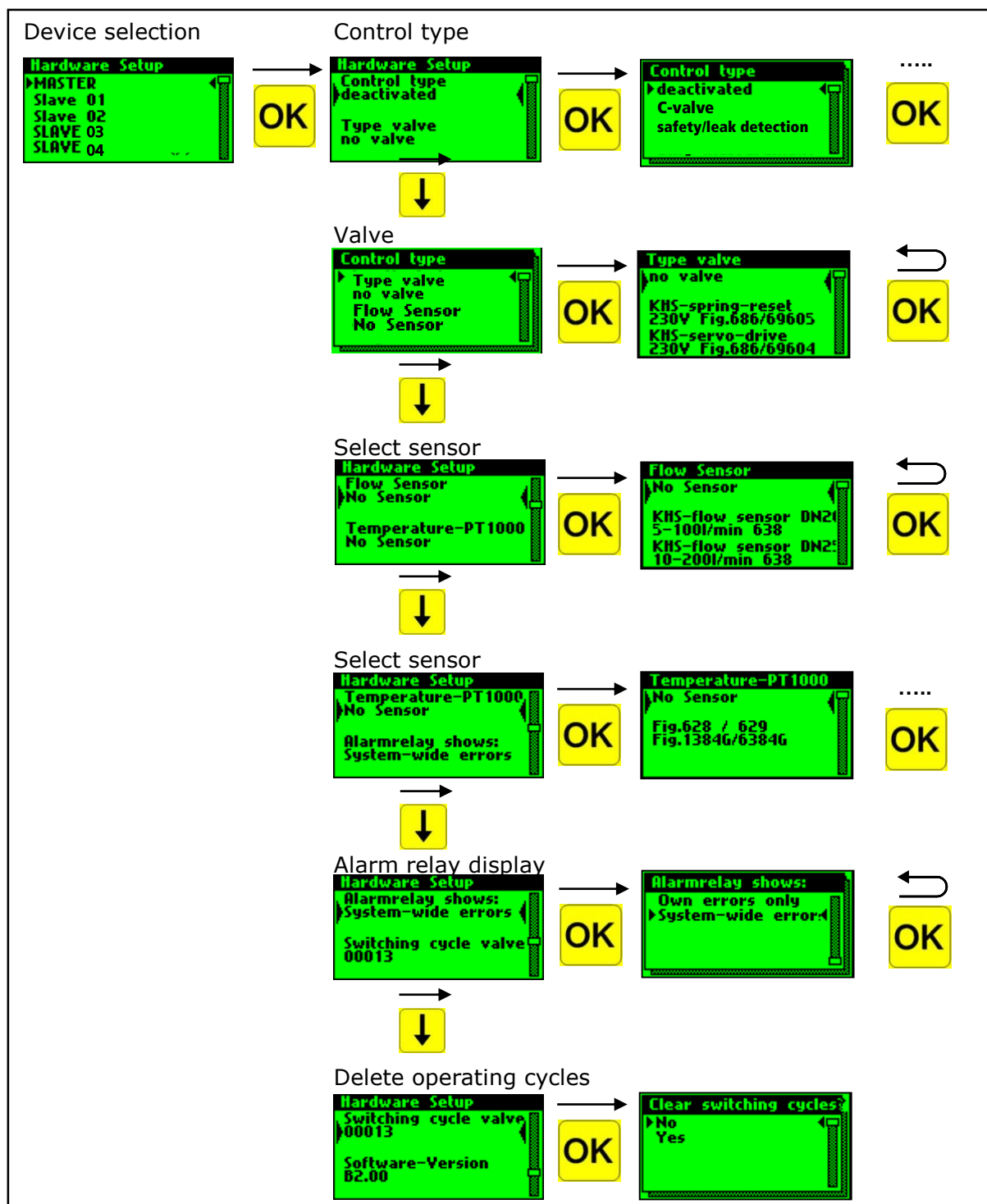


Note:

Check to see if the antenna icon can always be seen or if the LEDs glow green on all KHS Mini System Controls. Only then has a proper connection been established.

8.1.4.3 Device settings

In the "Device settings" submenu, the individual KHS Mini System Controls with the integrated actuators and sensors are logically linked to each other. Illustration 8.25 shows an overview of the "Device settings" submenu. Press the "↑" and "↓" buttons and confirm with "OK" to select the desired control. Then select the desired linking option (controller type, valve type, sensor type, alarm relay display, operating cycles) with "OK". After that, a selection opens in which the related component can be selected. Press "OK" again to open the device-specific setting facilities. They are explained in detail based on the sample project.



III. 8.25 Overview of the "Device settings" submenu

The following configuration steps are discussed based on the sample project from Illustration 8.1 (Page 16). For an overview of the system commissioning, Illustration 8.26 is presented.

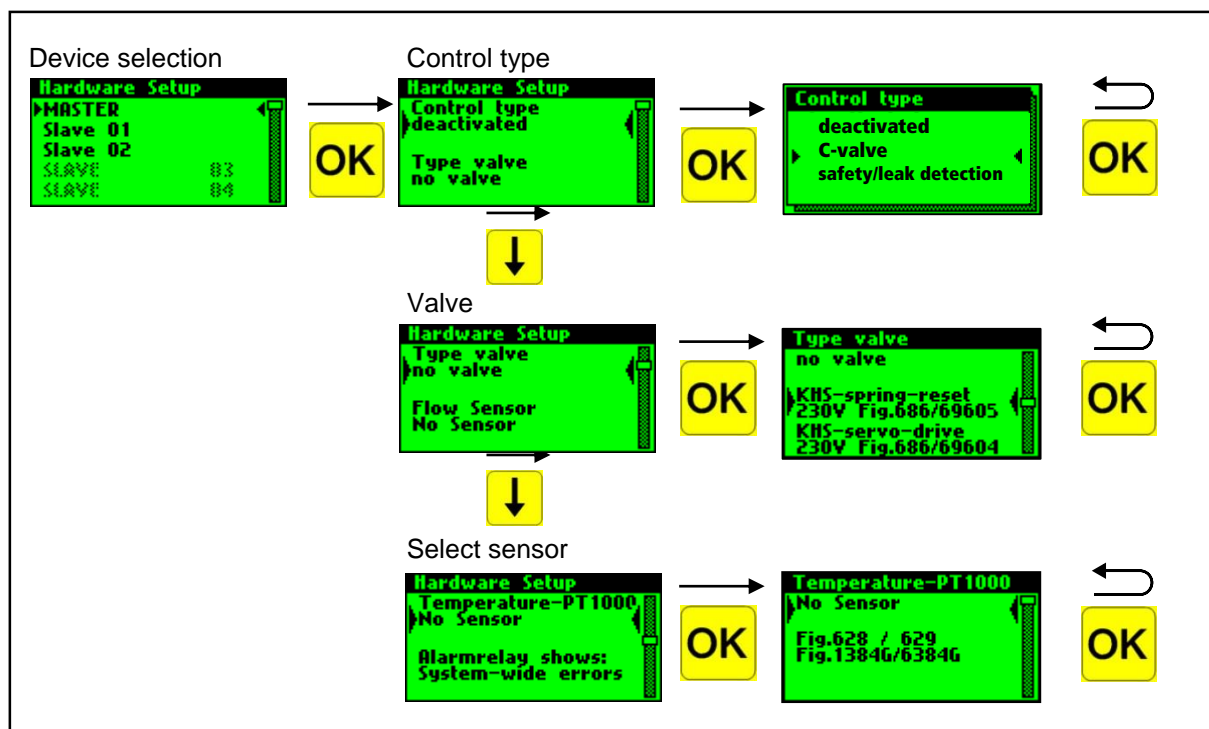
Overview for the system commissioning on the KHS Mini System Control -MASTER - Figure 686 02 (make a hand-written entry based on the example during the installation)

Building name:				KHS Isolating valve with servo drive and spring reset		KHS Isolating valve with servo drive		KHS-CONTROL-PLUS flow measurement valve Figure 138 4G and Figure 638 4G								KHS PT1000	KHS drain with over-flow	Water sensor
Date:				Figure 686 05 Figure 696 05		Figure 686 04 Figure 696 04		Measurement range range	Measurement range range	Measurement range range	Measurement range range	Measurement range range	Measurement range range	Measurement range range	Measurement range range	Figure 628 0G 629 0G	Figure 688 00	Figure 620 00
Person commissioning:				Figure 686 05 Figure 696 05		Figure 686 04 Figure 696 04		Measurement range range	Measurement range range	Measurement range range	Measurement range range	Measurement range range	Measurement range range	Measurement range range	Measurement range range	Figure 628 0G 629 0G	Figure 688 00	Figure 620 00
Control	No.	Serial no. (Rating plate on the control)	Location/room	or				Example										
Master		4711	Cellar	x		x										x	x	x
Slave 1.1	1.1	2675	Cellar															
Slave 1.2	1.2	1187	GF	x													x	
Slave																		

III. 8.26 Overview for the system commissioning of the sample project

Configuration -MASTER- (C-valve)

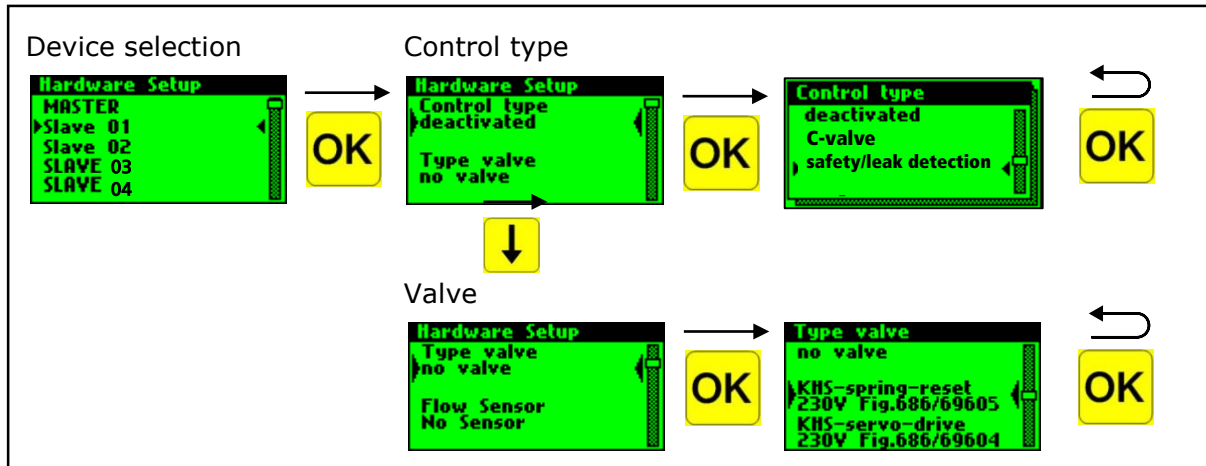
In the sample project being used, the KHS Mini System Control -MASTER- should trigger a C-valve in the form of a VAV-maximum flow isolating ball valve with spring reset servo-drive. Furthermore, a KHS-CONTROL-PLUS flow measurement valve is to be evaluated. Additional settings for this operating mode are explained in Chapter 8.1.4.4. Illustration 8.27 shows the configuration of a C-valve.



III. 8.27 Configuration of C-valve

Configuration of -SLAVE- 1.1 (safeguard)

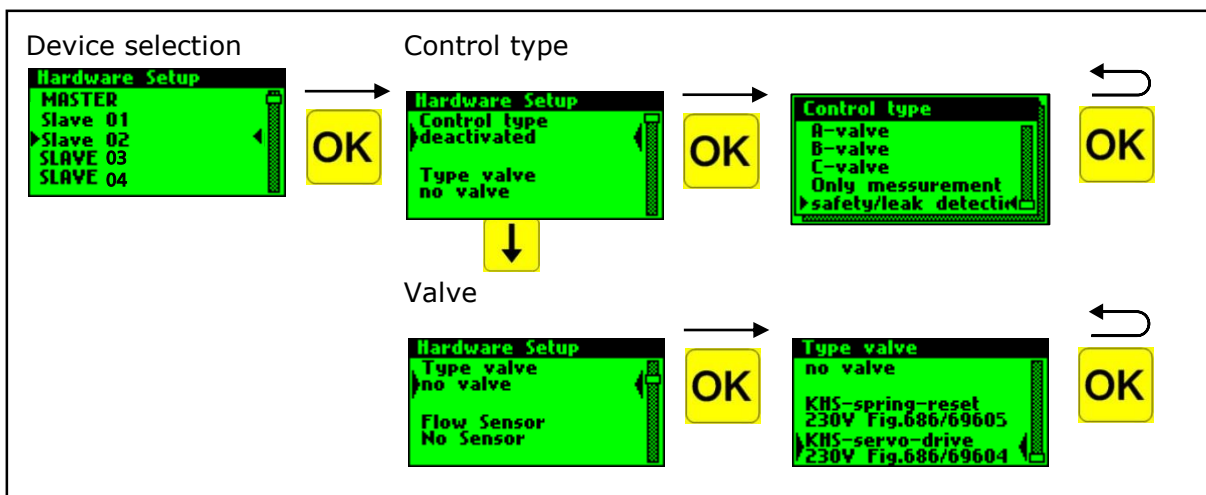
In the sample project being used, the KHS Mini System Control -SLAVE 1.1- should act as a leakage safeguard. The KHS Mini System Control -SLAVE 1.1- should trigger a KHS Isolating valve with spring reset servo-drive as a safety valve. Additional settings for this operating mode are explained in Chapter 8.1.4.4. Illustration 8.28 shows the configuration of a safety device.



III. 8.28 Configuration of safeguard

Configuration of -SLAVE- 1.2 (C-valve)

The KHS Mini System Control -SLAVE- 1.2 in this sample project should trigger a C-valve in the form of a KHS Isolating valve with spring reset servo drive. Furthermore a KHS-CONTROL-Plus should be evaluated. Additional settings for this operating mode are explained in Chapter 8.1.4.4. Illustration 8.29 shows the configuration of a C-valve.

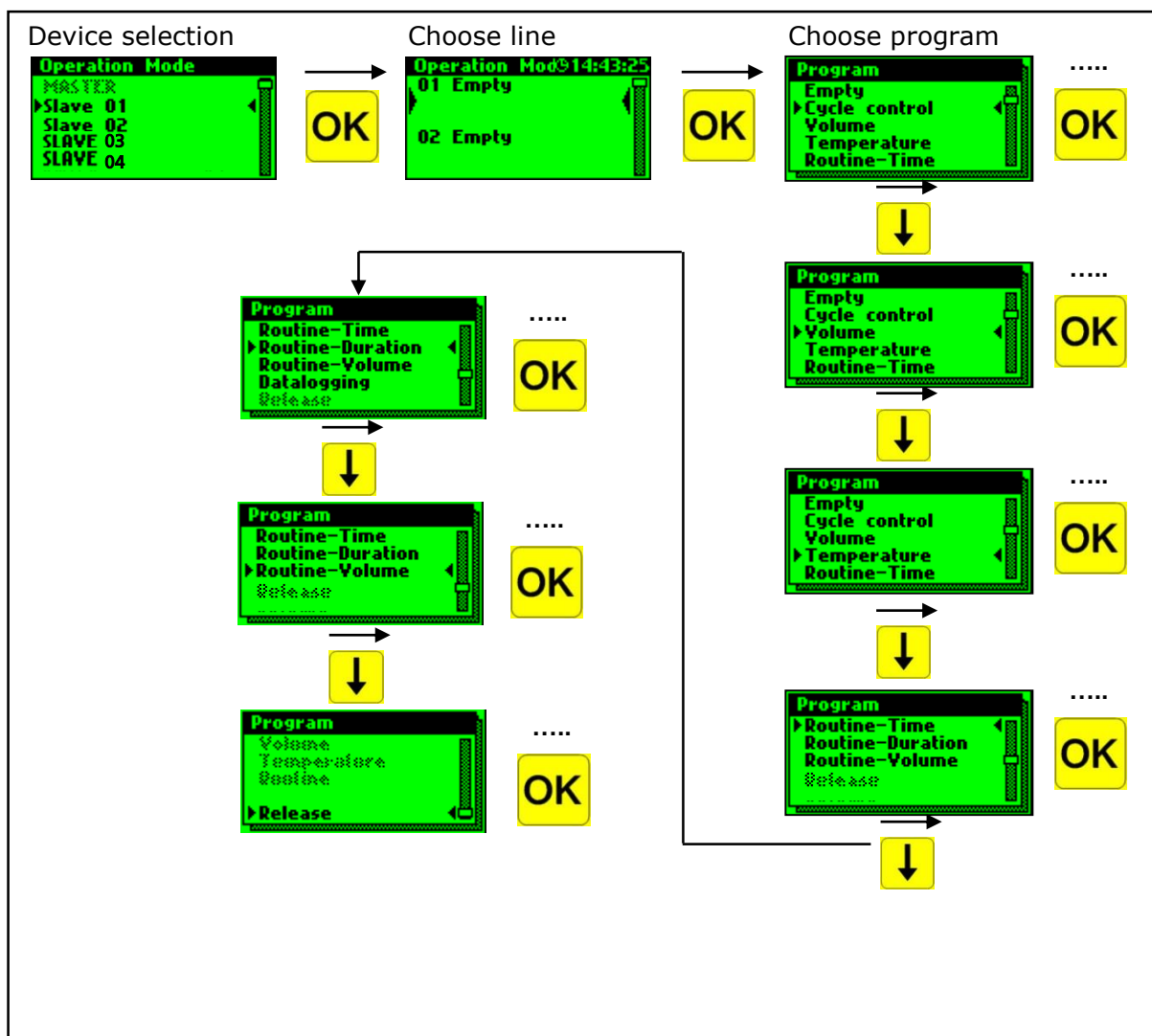


III. 8.29 Configuration of a safeguard

8.1.4.4 Operating modes

In the "Operating modes" submenu, the individual KHS Mini System Control programs and times are added through lines.

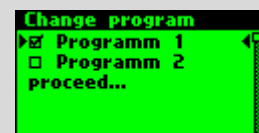
Illustration 8.30 shows an overview of the "Operating modes" shows. Press the "↑" and "↓" buttons and confirm with "OK" to select the desired control. Subsequently use "OK" to select a line; each line can describe one program. A selection then opens to choose which programs will be selected. Press "OK" again to open the specific setting facilities, depending on the program. They are explained in detail based on the sample project.



III. 8.30 Overview of the "Operating modes" submenu

Note:

If the program switch is "Activated" (see Chapter 8.1.4.6), a query is presented during the operating modes configuration to determine the program this applies to (see III. 8.31). The two mentioned flushing programs can be switched using an external manual switch. The electrical connection is shown in Chapter 6.2.2.5.



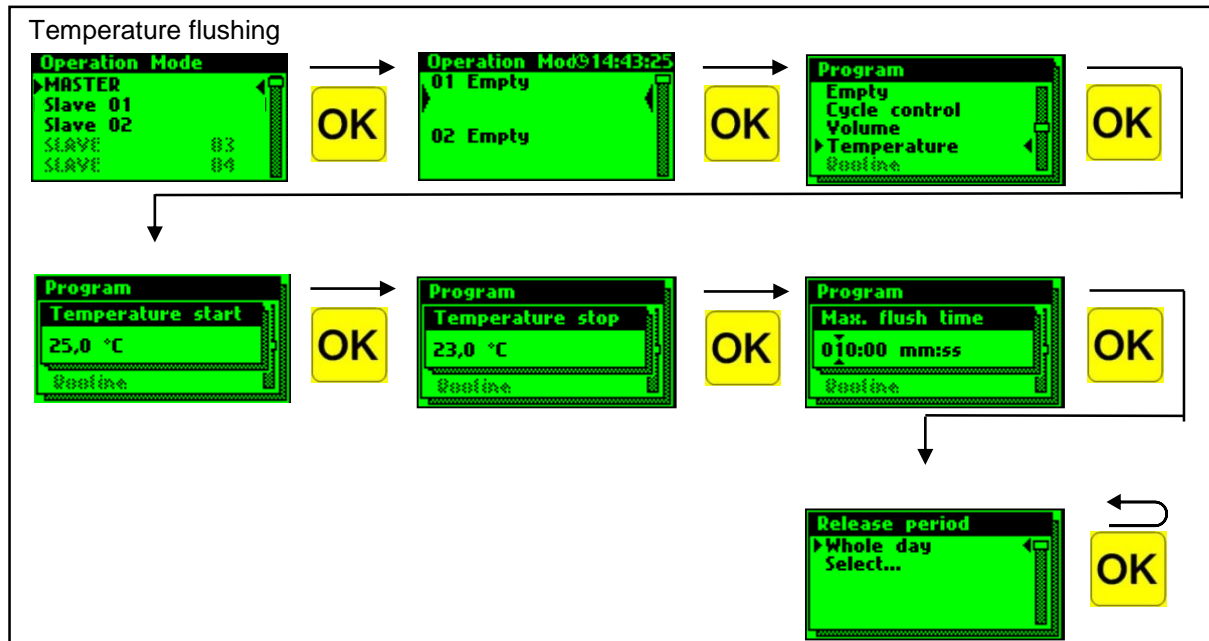
III.8.31 Program switching

Configuration of -MASTER- (temperature/time flushing)

Temperature flushing

The KHS Mini System Control -MASTER- in the sample project is linked to a temperature measurement valve. To control the temperature-dependent water exchange, the "Temperature" program needs to be selected. The starting and stopping temperatures and the maximum flushing time need to be set for the "Temperature" program.

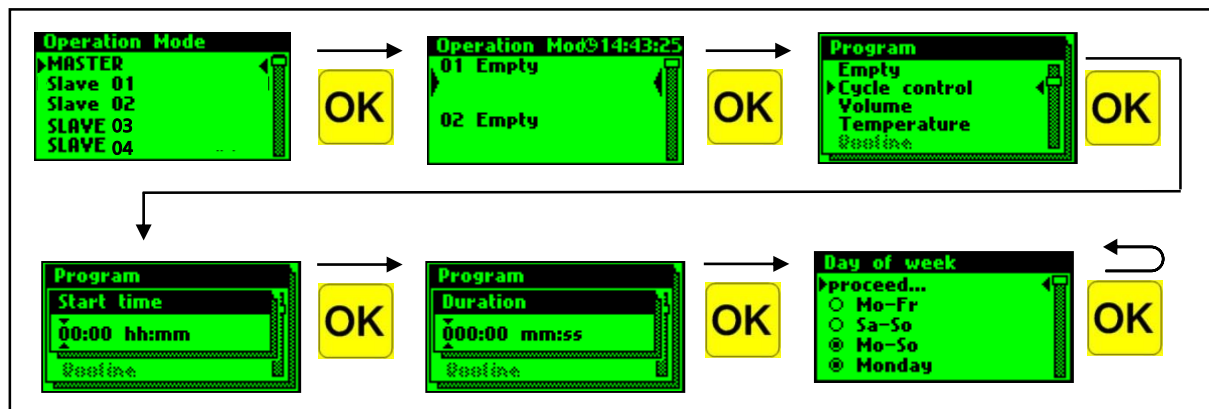
Illustration 8.32 shows the configuration of the "Temperature flushing" operating mode.



III. 8.32 Configuration of temperature flushing

Time flushing

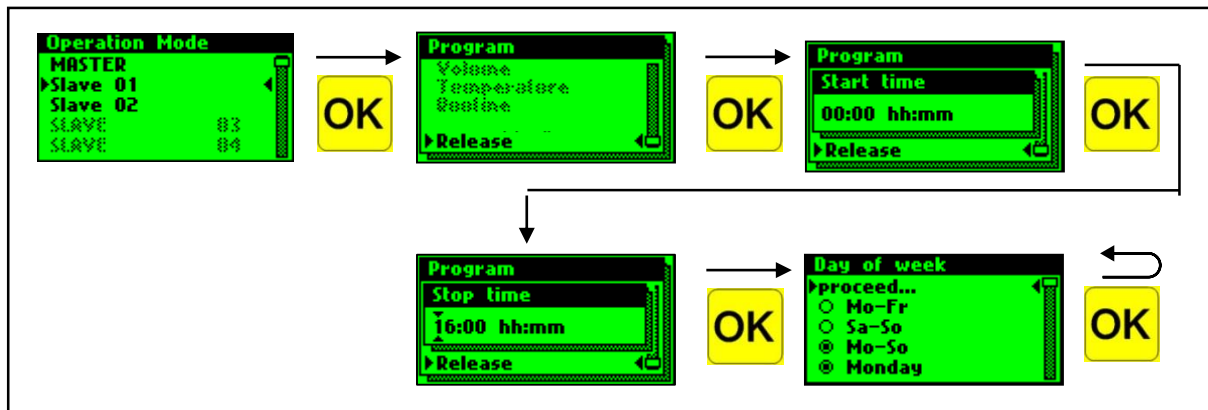
The KHS Mini System Control -MASTER- in this sample project is connected to a C-valve. To time-control the water exchange, a line needs to be added with the "Cycle control" program. When the program is selected, define the times. In the "Cycle control" program, a starting time and the duration of the water exchange need to be stated. Furthermore, the desired weekday can be selected through a dropdown list. Illustration 8.33 shows the configuration of a "Time control" operating mode.



III. 8.33 Configuration of time flushing

Configuration of -SLAVE- 1.1 (safeguard)

The KHS Mini System Control -SLAVE- 1.1 in this sample project is planned as a safeguard SLAVE. The safeguard is always activated using a water sensor. When a line is selected with the "Release" program, the times can be defined. This valve is open only in times-of-use. A starting and stopping time need to be defined for the release. Furthermore, the desired weekday can be selected through a dropdown list. Illustration 8.34 shows the configuration of the "Safeguard" operating mode. If no operating mode is configured, the safety valve is open the whole day and only reacts to a signal from the water sensor.

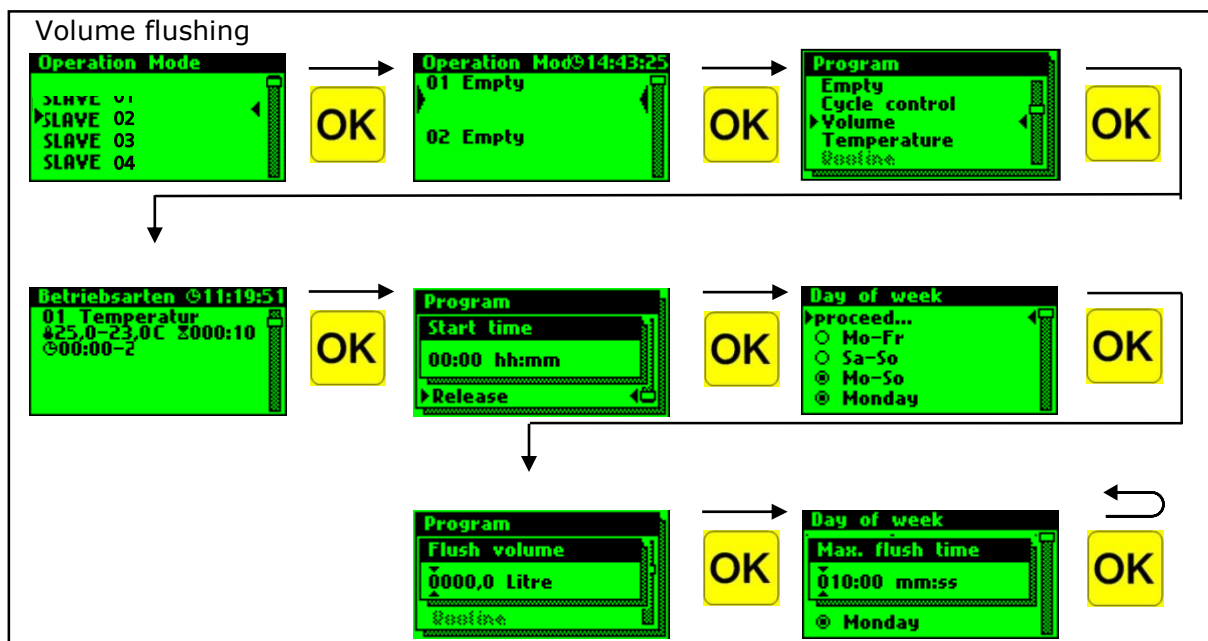


III. 8.34 Configuration of a safeguard

Configuration of a -SLAVE- 1.2 (volume flushing)

The KHS Mini System Control -SLAVE- 1.2 in the sample project are each linked to a volume flow sensor. To control the volume-dependent water exchange, the "Volume" program needs to be selected. For the "Volume" program, set the starting time, the flushing volume and the maximum flushing time. Furthermore, the desired weekday can be selected through a dropdown list for both programs. Illustration 8.35 shows the configuration of the "Volume flushing" operating mode.

Illustration 8.35 shows the configuration of the "Temperature flushing" operating mode.



III. 8.35 Configuration of volume flushing

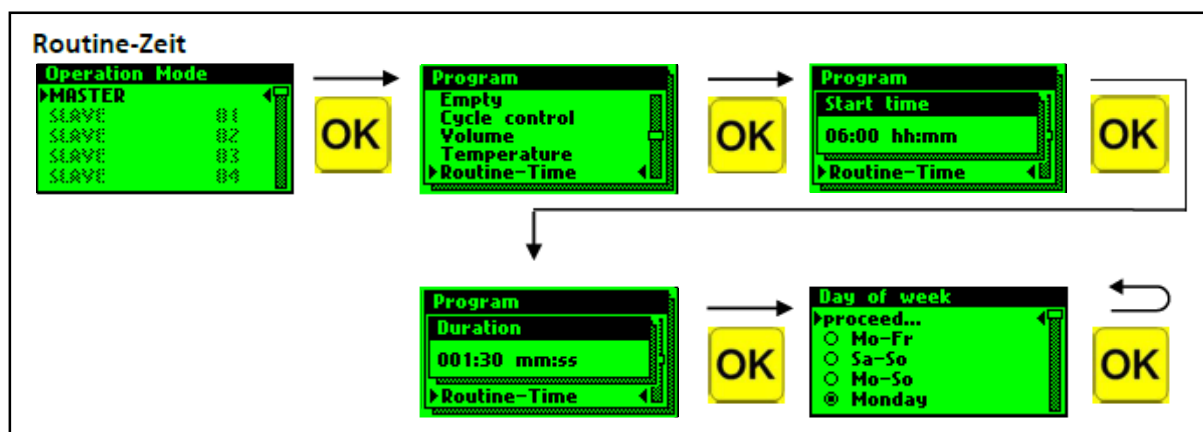
▀ Routine-time, Routine-duration and Routine-volume

The sample project is a cold-water line in which the cold-water temperature in the winter, for instance, could always lie below the set starting temperature. To prevent an impermissible stagnation, after the configuration of the temperature flushing, a routine flushing of the KHS Mini Control System is automatically always stored. The routine flushing "Routine time" is preset for this; however a selection can also be made between "Routine duration" and "Routine volume" as an alternative. Please note that only one routine flushing can be stored with one KHS Mini System Control.

Routine time

If there is no temperature flushing within 7 days, the water exchange is guaranteed through the "Routine time" operating mode. For the "Routine time" operating mode, the starting time, the duration and the weekdays of the water exchange can be stored for that.

Illustration 8.36 shows the individual steps for configuration.

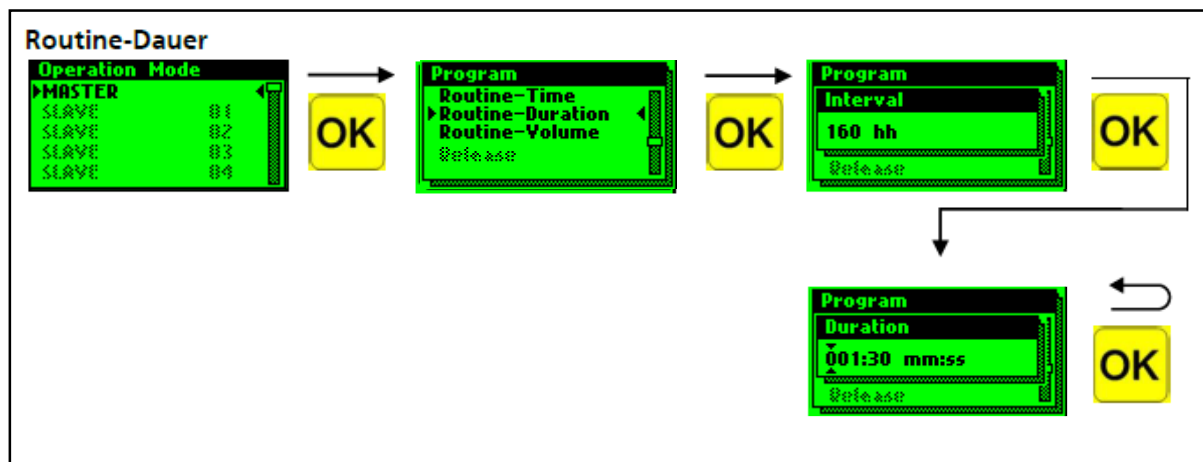


III. 8.36 Configuration of routine time

Routine duration

If there is no temperature flushing within the configured interval, the water exchange is guaranteed through the "Routine duration" operating mode. To accomplish that, the decisive interval (max. 168 h) and the duration of the water exchange can be stored in the "Routine duration" operating mode.

Illustration 8.37 shows the individual steps for configuration.

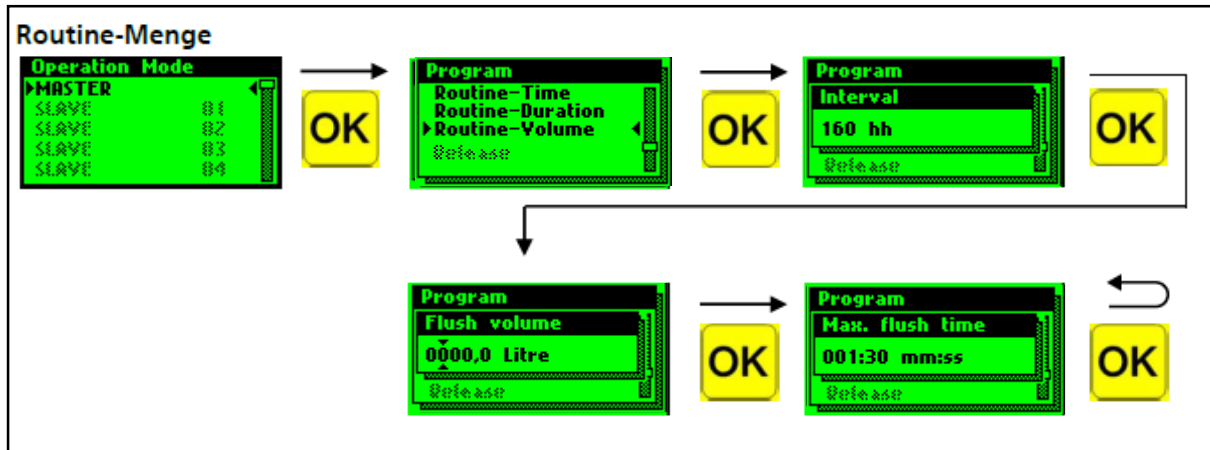


III. 8.37 Configuration of routine duration

Routine volume

If there is no temperature flushing within the configured interval, the water exchange is guaranteed through the "Routine volume" operating mode. To accomplish that, the decisive interval (max. 168 h), the volume and the maximum flushing time of the water exchange can be stored in the "Routine volume" operating mode.

Illustration 8.38 shows the individual steps for configuration.



III. 8.38 Configuration of routine volume

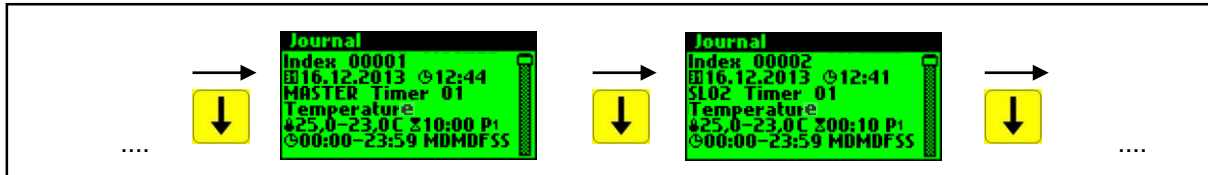


Note:

After successfully configuring your system controls, it is recommended to save the configuration as a backup file. If the KHS Mini System Control -MASTER- is defective it can be quickly replaced and the configuration can be read in. That saves having to configure everything again.

8.1.4.5 Journal

The "Journal" submenu provides a facility for opening the event logging. Press the "↑" and "↓" buttons to change between the individual journal entries. The event log documents the water exchange processes, the error messages and the configuration changes made through the Kemper KHS Mini System Control (for an example, see Ill. 8.39). Up to 50,000 journal entries can be saved. Based on the documentation about the locality, duration of the water exchange and the temperatures, recordings can be made across a defined time period and verify the hygienic state of the drinking water system.



Ill. 8.39 Illustration of a journal entry index 9-10, configuration change



Note:

The stored journal entries can be saved through the USB interface on a USB memory stick. This function is explained in detail in Chapter 8.1.5.

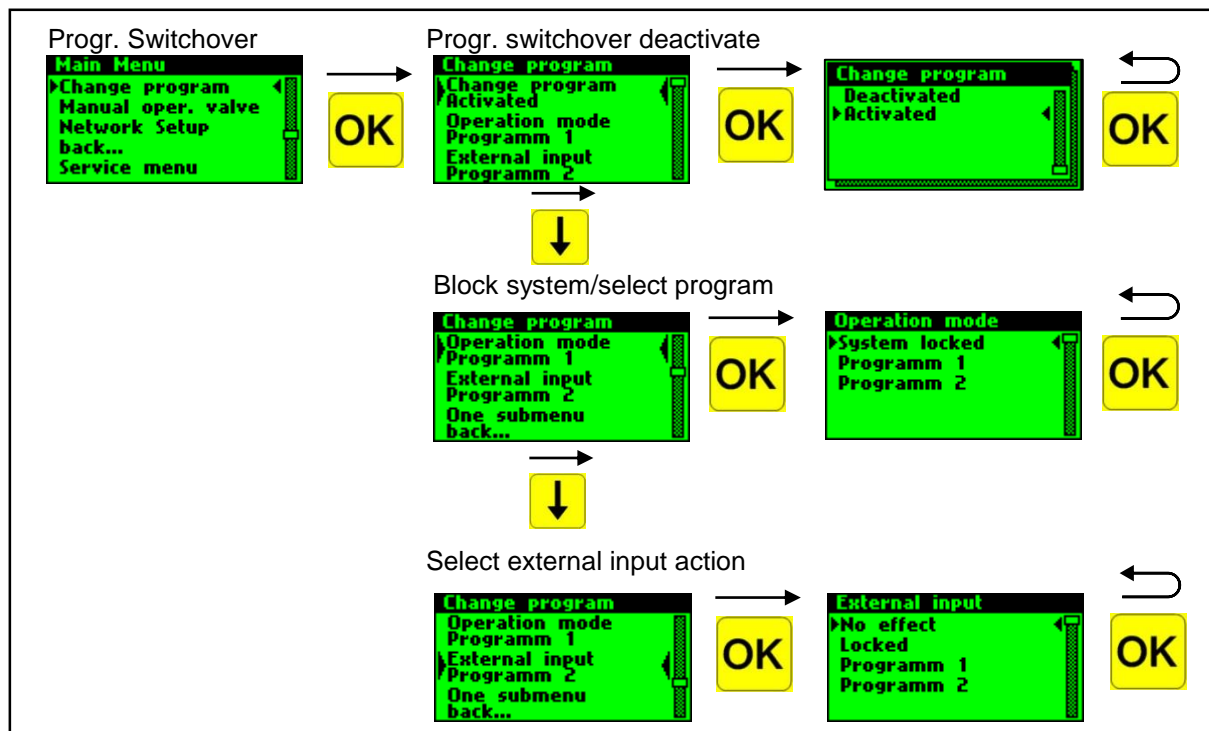
8.1.4.6 Switching programs

With the KHS Mini System Control -MASTER- it is possible to switch between two flushing programs or to block one through an external switch. The programs can also be activated or deactivated in the "Switch program" submenu. The "External input" or "External switch" can be assigned to a program switch in this submenu. The functions are described in Illustration 8.40.



Note:

The two mentioned flushing programs can be switched using an external manual switch. The electrical connection is shown in Chapter 6.2.2.5.



III. 8.40 Overview of the "Switch program" submenu

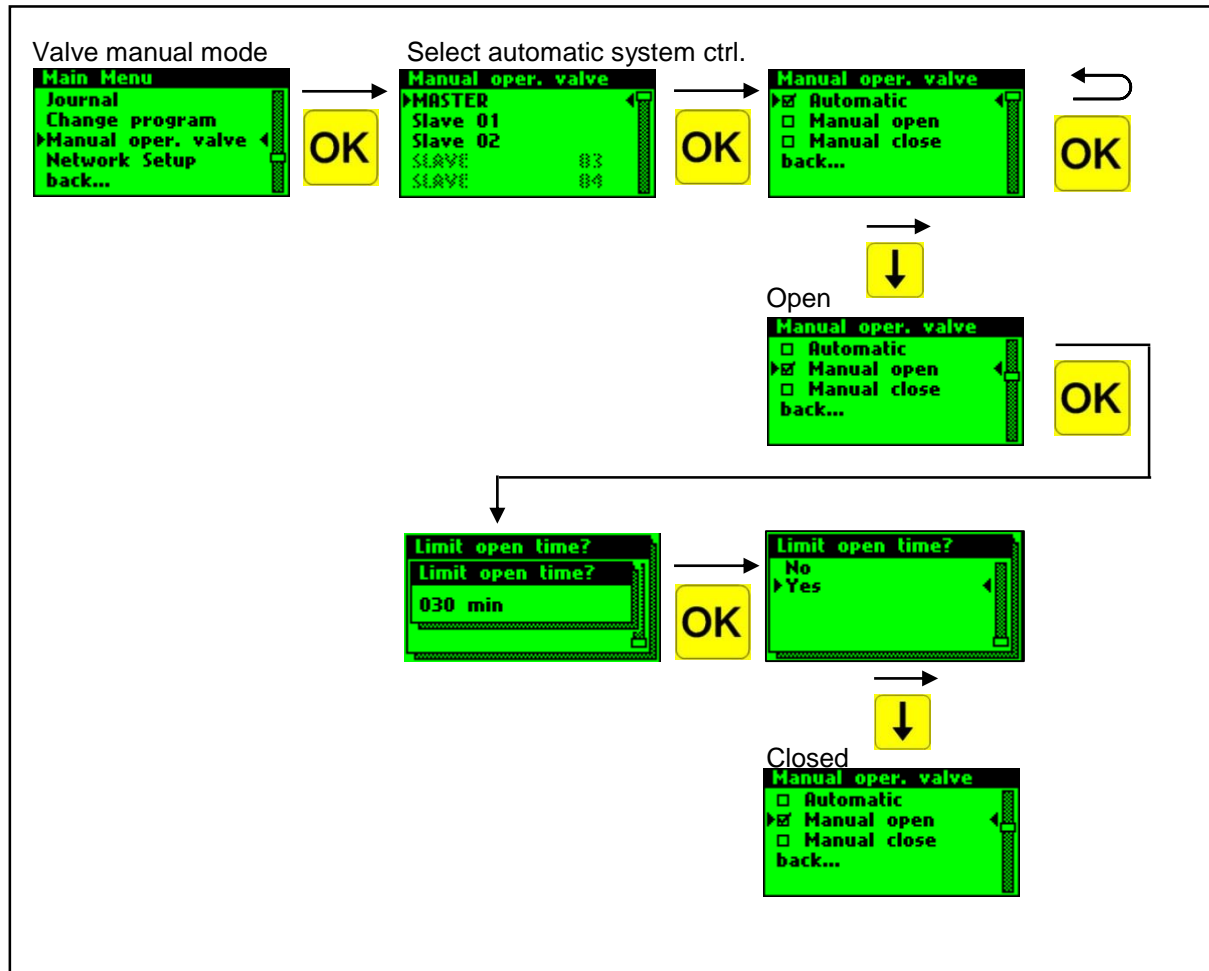
8.1.4.7 Valve manual mode

With the KHS Mini System Control -MASTER-, it is possible to run a function test of the valves through the "Valve manual mode" operating mode. Furthermore, the valves can be individually triggered during maintenance. The functions are simulated in Illustration 8.41.



Maintenance:

A function test is recommended after configuring the "Device settings" submenu to immediately exclude possible errors.



Ill. 8.41 Overview of the "Valve manual mode" submenu

8.1.4.8 Error handling

All the errors that occur in the system are sent to the KHS Mini System Control -MASTER- and are signalled acoustically through a buzzer. It is possible to integrate an alarm relay (see Chapter 6.2.2.8). In normal operation, the alarm relay is energized ("pulled") with voltage. If there is an error, the voltage drops and an acoustic signal reports the error. During this it does not matter what kind of impact the malfunction could have on the system. The control goes into alarm latching and has to be acknowledged after the malfunction has been repaired.

Switch off / acknowledge buzzer
1 x OK Buzzer off
The control remains in alarm latching



III. 8.42 Acknowledge the buzzer

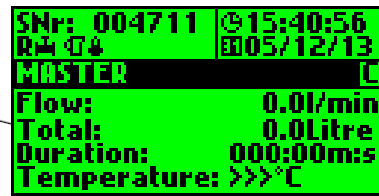
Error display
The errors of the MASTER / SLAVE controls are displayed flashing in the general plan with a lightning icon

Change into the detail view
2 x OK Selected control



III. 8.43 Error display

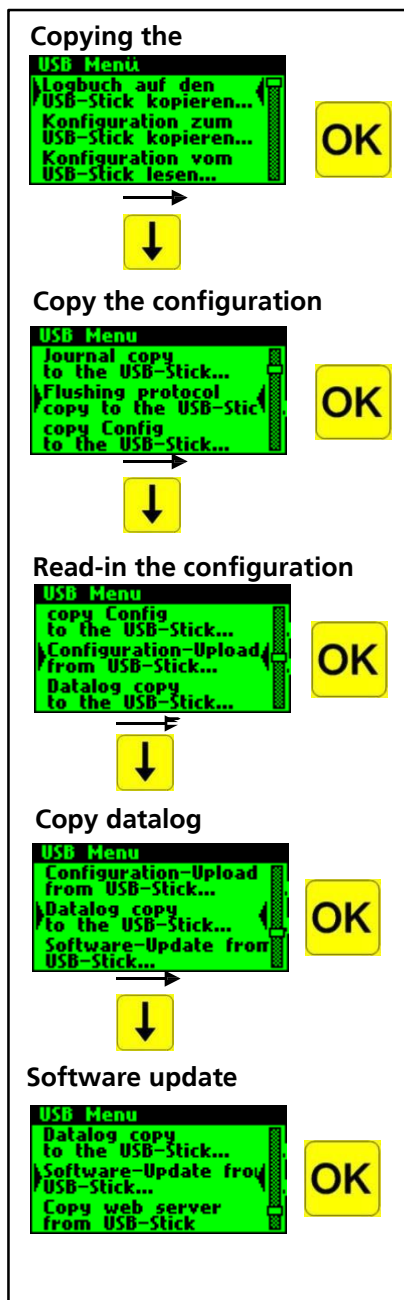
Acknowledge error
After the malfunction has been repaired, the malfunction can be acknowledged in the detail display
1 x OK Acknowledge error



III. 8.44 Acknowledge the error

8.1.5 Using the USB interface

With the USB interface of the KHS Mini System Control -MASTER-, it is possible to copy the journal (CSV file), the configuration of the system controls (CFG file) and the datalog (CSV file) onto a USB memory stick. Furthermore, backed-up configurations (CFG file) and new software updates (UPD file) can be written to the KHS Mini System Control -MASTER-. The functions are simulated in Illustration 8.45.



III. 8.45 Overview USB menu



Note:

The USB menu is not visible in normal mode. The menu is automatically activated when a USB memory stick is connected to the KHS Mini System Control -MASTER-.



Note:

After selecting a menu item, follow the instructions on the subsequent display.

8.2 Configuration PC-software

Note:

The configuration of the PC-software is explained in a separate operating instruction. You find this manual on our website www.kemper-olpe.de or with the PC-software itself.

To use the PC-software, a USB adapter cable (figure 686 02 016) is needed.

9. Description of malfunctions and malfunction repair

Table 9.1: Error description / Error handling

Error description / Error handling				
Status LED on Slave	Error	Potential cause	Measures	Impact
General error				
Permanent flashing red	Backwater in drain	Drain is clogged or cannot accept the flushing volume.	Check the drain channel, channel acceptance capacity.	Error message! Defective control will be completely blocked
	Backwater in drain	Float switch on the drain has a cable break	Replace cable / switch	Error message! Defective control will be completely blocked
	Leak on sensor	Pipe failure, moisture on the sensor	Check the local area and remove the moisture	The safety valve is blocking the system.
Flashes red (5 per sec.)	Temperature flushing switched off during runtime	Medium did not reach the switch-off temperature in the set time	Check the installation setup and the maximum flushing time.	Error message! Temperature operating mode is blocked in the defective control.
	Volume flushing switched off during runtime	Set volume not reached	Check the installation setup and the maximum flushing time.	Error message! Volume operating mode is blocked in the defective control.
	"Flow with closed valve detected"	Flow is detected by the vortex flow sensor with the valve closed	Check the functioning of the flush valve	Error message! The involved valve is blocked.
	"No flow detected although valve is open"	No flow is detected during a flushing process.	Check the flushing line and the flushing valve	Error message! The involved valve is blocked.
Fashes red (1 per sec.)	PT1000 value too high	Sensor defective / No sensor available	Replace sensor / Check inputs on the MASTER	Error message! Temperature flushing operating mode is blocked in the defective control.
	PT1000 value too low	Sensor defective / No sensor available	Replace sensor / Check inputs on the MASTER	Error message! Temperature flushing operating mode is blocked in the defective control.
Only Master flashes red (1 per sec.)	Real-time clock data inconsistent	Data in the clock are not consistent	Check the time & date and adjust if necessary. Check battery/replace if applicable	All time-based services are running on false time/date.

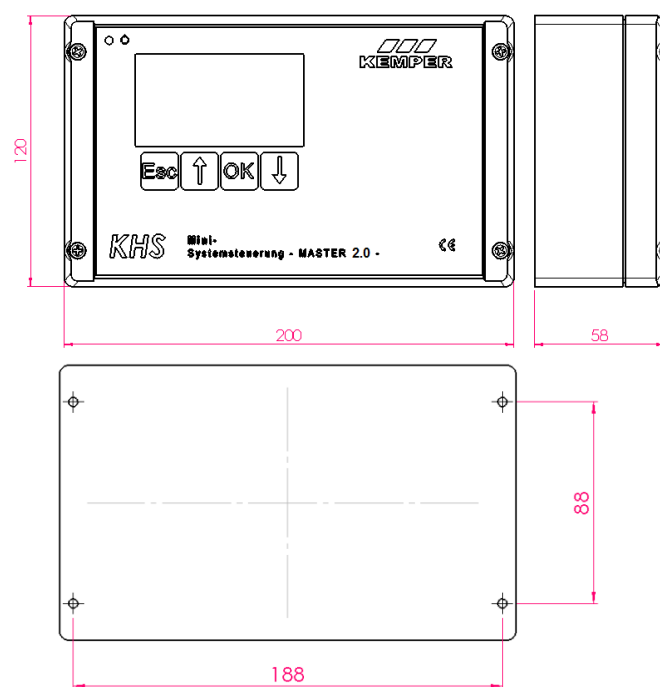
Error description / Error handling				
Status LED on Slave	Error	Potential cause	Measures	Impact
Bus error				
Flashes orange (5 per sec.)	No response from the SLAVE	Cable break, false installation, interference fields	Check CAN bus cables and installation	Faulty SLAVE does not function
	No response from the SLAVE	SLAVE does not have voltage	Restore SLAVE power supply	Faulty SLAVE does not function
	No response from the SLAVE	SLAVE with its corresponding serial number no longer part of the plant (e.g., after a replacement)	Assign the correct serial number to the SLAVE or delete the device from the system	Faulty SLAVE does not function
	CAN bus line fault	Cable break, false installation, interference fields	Check CAN bus cables and installation	CAN-BUS and all SLAVES do not function.
Only on Master Flashes orange (5 per sec.)	Too many bus subscribers CAN-BUS A	More than 31 SLAVES are connected to CAN-BUS A	Rewire or the BUS subscribers or change the position of the MASTER in the bus system.	CAN-BUS A faulty. Communication and functions can be impaired.
	Too many bus subscribers CAN-BUS B	More than 31 SLAVES are connected to CAN-BUS B	Rewire or the BUS subscribers or change the position of the MASTER in the bus system.	CAN-BUS B faulty. Communication and functions can be impaired.
	Communication error CAN Bus A	Cable break, false installation, interference fields	Check CAN Bus A cables and installation	Affected SLAVES do not function
	Communication error CAN Bus B	Cable break, false installation, interference fields	Check CAN Bus B cables and installation	Affected SLAVES do not function

Table 9.2: Description of warnings / notices

Description of warnings / notices				
Status LED on Slave	Error	Potential cause	Measures	Impact
Warnings				
Flashes red (1/ sec.)	Operating cycles exceed 10,000	The VAV on the defective SLAVE has performed more than 10,000 operating cycles	Replace VAV bonnet in accordance with the maintenance manual and reset the operating cycles	The warning message cannot be confirmed. SLAVE continues to operate normally
No influence	Limit thermal disinfection exceeded	The monitored temperature has exceeded the set limit value	Check to see if it needs to be set otherwise	Entry in journal and optional message via email
	Limit set-point max. exceeded	The monitored temperature has exceeded the set limit value	Check to see if it needs to be set otherwise	Entry in journal and optional message via email
	Limit set-point min. undercut	The monitored temperature has undercut the set limit value	Check to see if it needs to be set otherwise	Entry in journal and optional message via email
	Frost protection limit undercut	The monitored temperature has undercut the set limit value	Prevent danger of valves freezing up	Entry in journal and optional message via email.
Notes				
No influence	Set-point OK	Notice that the monitored temperature is in the target range	No action needed!	Entry in journal and optional message via email
Illuminates green	Control in standby	No flushing pending. Control in standby	No action needed!	No influence
Flashes green	Flushing is running	The valve on the involved control is flushing / is open	No action needed!	Entry in journal
Flashes green and orange in an alternating sequence of 1 sec	Control unit is disabled	System control is installed correctly, however not activated	Activate system control	No influence

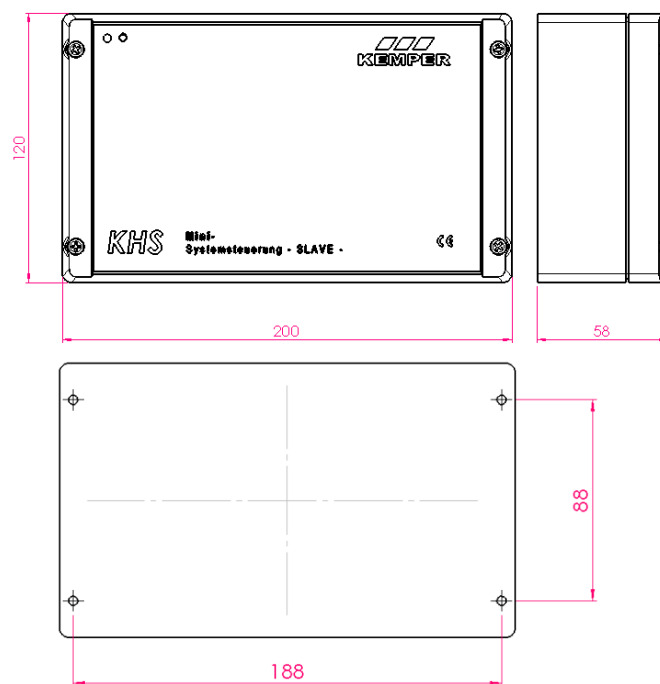
10. Dimensions, attachment dimensions

■ Hole clearances -MASTER-



III. 10.1 Dimensions and hole clearances for attachment holes on the -MASTER-

■ Hole clearances -SLAVE-



III. 10.2 Dimensions and hole clearances for attachment holes on the -SLAVE-

11. Accessories

Tab. 11.1 Optionally available accessories

Optionally available accessories	FIGURE
KHS Isolating valve with servo drive 230 V	686 04
KHS Isolating valve-plus with spring-reset servo drive (230 V)	686 05
KHS drain with overflow monitor	688 00
KHS temperature sensor fitting PT 1000	628 0G / 629 0G
KHS flow measurement valve	638 4G / 138 4G
Leakage water sensor	620 00 001

12. Wiring instructions for components with electrical connection

Tab. 12.1 Wiring instructions for components with electrical connection

Designation	For KEMPER order no.	Cable cross-section mm ²	Max. cable length m	Cable type*
KHS Isolating valve-plus with spring-reset servo drive (230 V)	68605015...032 69605015	3 x 1.5 ²	9500	NYM-J 3 x 1.5mm ²
KHS Isolating valve with servo drive (230 V)	68604015...032 69604015	4 x 1.5 ²	9500	NYM-J 4 x 1.5mm ²
KHS drain with overflow monitor	68800020...032	2 x 0.25 ²	150	J-Y(ST)Y 1x2x0.6mm ² or NYM-J 3x1.5mm ²
Kemper Control-plus Flow measurement valve Vortex principle	6384G015...025 1384G015...050	7 x 0.34 ² **	300	J-Y(ST)Y 4x2x0.6mm ²
KHS temperature sensor fitting PT 1000	6280G015...050 6290G015...050	4 x 2 x 0.6	10,000	J-Y(ST)Y 4x2x0.6mm ²
CAN bus cable ^{***} The application is based on the ISO 11898 international standard.	68602005 68602006	1 x 2 x 0.25 ² ... 0.34 ² 1 x 2 x 0.34 ² ... 0.5 ² 1 x 2 x 0.50 ² ... 0.6 ² 1 x 2 x 0.75 ² ... 0.8 ²	0 m ... 40 m 40 m ... 300 m 300 m ... 600 m 500 m ... 1000 m	CAN bus cable
Leakage water sensor	6200000100	2x0.75 ²	0-50 50-500	Standard cable UL-LIYCY

* Possible cable type for fixed routing

** Shielded cable supply line

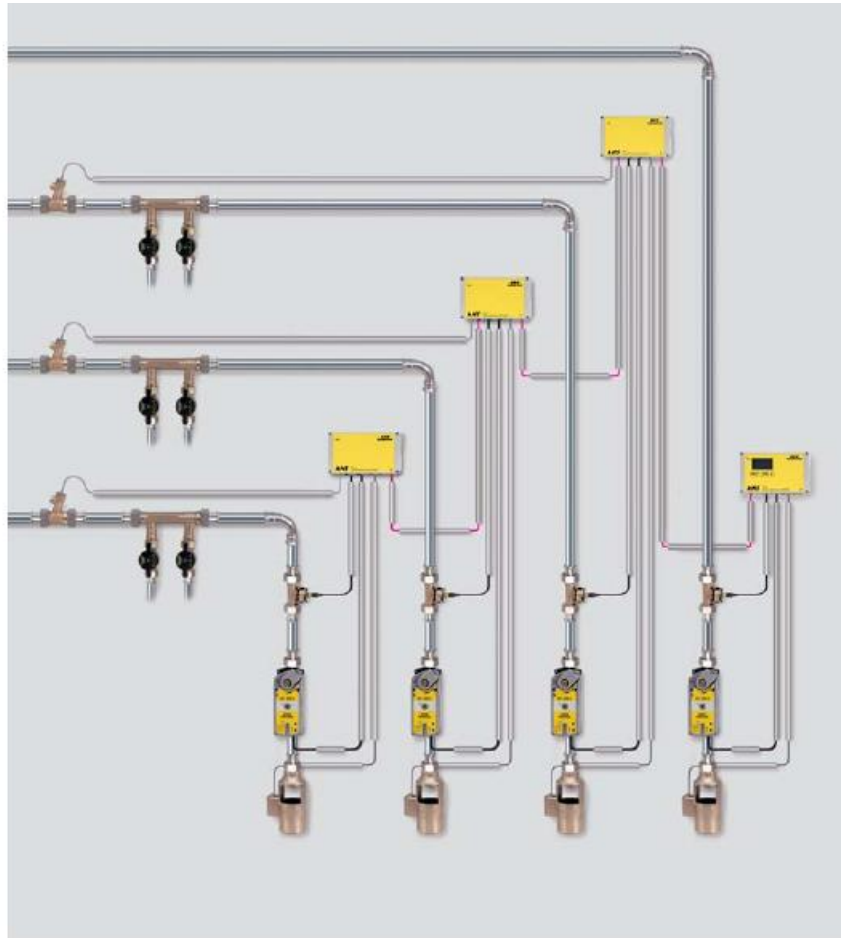
*** (To be provided by construction site)

Version: 21/11/2013

13. Appendix

13.1 Valve technology

The C-valve technology enables exchanging the water of an individual riser line or one individual distribution line without dependence on the other water exchanging valves.



C-Ventil



KHS Isolating valve with servo drive

Figure 686 04 230 V AC
Figure 696 04 230 V AC

(Discharge water limited max. 2 l/min)

C-Ventil



KHS Isolating valve with servo drive and spring reset

Figure 686 05 230 V AC
Figure 696 05 230 V AC

(Discharge water limited max. 2 l/min)

13.2 Overview for the system commissioning of the KHS Mini System Control



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Overview for the system commissioning on the KHS Mini System Control

— MASTER — Figure 686 02 005

— MASTER 2.0 — Figure 686 02 008

(make a hand-written entry based on the example during the installation)

Building name:		KHS Isolating valve with servo drive and spring reset		KHS Isolating valve with servo drive		KHS-CONTROL-PLUS flow measurement valve Figure 138 4G and Figure 638 4G							KHS drain with over-flow	Water-sensor
Date:		Figure 686 05 Figure 696 05		Figure 686 04 Figure 696 04		a	b	c	d	e	f	g	Figure 688 00	Figure 620 00
Person commissioning:		Figure 686 05 Figure 696 05		Figure 686 04 Figure 696 04		Figure 638 4G and Figure 638 4G							Figure 628 0G 629 0G	Figure 620 00
Control	No.	Serial no. (Rating plate on the control)	Location / room	Control unit (A-valve; B-valve; C-valve; measuring) (A/B-valve apply only to Master 2.0)	Associated B-Ventil -Serial no.- of system commissioning (Column applies to Master 2.0)	or								
Master														
Slave	1													
Slave	2													
Slave	3													
Slave	4													
Slave	5													
Slave	6													
Slave	7													
Slave	8													

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Güte ist bei uns die Norm • seit 1864

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NOTES:

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